Al-Mustafa International Translation and Publication Center

SCIENCE & RELIGION

IN A MONOTHEISTIC PERSPECTIVE

Second Edition

MEHDI GOLSHANI

Prof. Keith Ward

(He is a British Philosopher, theologian, priest , scholar and is a fellow of the British Academy. He was Professor of the History and Philosophy of Religion at King's College, London, and Regius Professor of Divinity at Oxford.):

Dear Mehdi Golshani, Thank you so much for sending your excellent book, 'Science and Religion'. It is both comprehensive and well expressed, and it will take a place of honour on my library shelves. It is so heartening to know that, beneath all the political struggles of our time, there can be such an honest and rational understanding of modern science and religion, from within our different cultures. I am very grateful to you.

Prof. Roger Trigg

(He is a Britidh Philosopher, who is Emeritus professor of philosophy at the university of Warwick. He was president of the British Society for Philosophy of Religion and The European Society for Philosophy of Religion.):

I have now been able to gather my thoughts and can tell you I was very impressed by the book. It was both comprehensive, wide-ranging and lucid. I agreed with its general argument, not surprisingly as I notice that you quote me several times!... In short I found everything in the book very stimulating and thought-provoking.
I hope it has been generally well-received and widely read. It certainly deserves to be.

Prof. Harold Koeing

(Professor of Psychology at Duke University in America and head of the Center for Spirituality, Theology and Health)

Mehdi – excellent – the book looks very impressive! The topics are very comprehensive, covering many important topics. Thank you.

Mehdi Golshani is a distinguished emeritus professor of physics at Sharif University of Technology (in Tehran, Iran) and was the founder and chairman of the philosophy of science at that University . His research Interests include particle physics, foundational & philosophical aspects of physics ,philosophy of science,and science & theology. Among his books are: From Physics to Metaphysics (1997), The Holy Qur'an and the Sciences of Nature (2011) and Issues in Islam and Science (2012).

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SCIENCE & RELIGION

IN A MONOTHEISTIC PERSPECTIVE

Mehdi Golshani

Publisher's Forword

To begin and execute a research is like walking in the path of development and evolvement. When the seeds of the "questions" are planted, in the soil of the mind of the researcher, this phase initiates, and its end is culminated when the result and the outcome of knowledge and wisdom is gained.

Evidently, this end is a new chapter in itself, for growth, and announces beforehand this good news to humans. For the result of all those mental efforts will not only bring the blooming and flowering of talent and all kinds of Blessings to humans, but it also makes the mind of the researcher to ponder and shape new, more questions.

This will produce a great collection of growing plants and flowers for the seeking mind... Those "questions" are in fact, the seeds, which according to the necessities of Time and the strength of the researchers will grow and bloom by themselves. They will make Culture and Civilization to move forward.

In like manner, the increasing rate of transferring oneself from one place to another place and the decrease of the distances will make those seeds travel miles and miles, to faraway places, in order to install them inside the curious mind of other seekers. This will bring an amazing diversity and a novelty for another civilization...

It is true then, that the presence of knowledge and a good, capable management will help this project to develop itself and one has to admit indeed, that it has always played an important role...

Al-Mustafa International Publication and Translation Center, because of its global mission, and its special position among the Religious Schools and the colorful human diversity that it has developed inside itself, sees it as a moral duty to procure all the appropriate conditions for any research works, and takes its role in this matter, most seriously. To procure all kinds of necessary grounds, with an excellent management of all the existing possibilities and talents, and to care and protect all its researchers in religious fields; these are the most crucial responsibilities of the Department of Research in this International center.

We dearly hope that by being attentive to all these autonomous scientific movements, and by fortifying all the existing motives, we shall be able to witness the blooming of the Religious Culture in every part of this wide world!

Al-Mustafa International
Publication and Translation Center

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PREFACE

Modern science started in a theistic environment, and the founders of modern science considered the study of nature as a kind of worship.

But, gradually some schools of thought appeared that gave significance only to the sense–based data. The fast advance of modern science, both empirically and theoretically, fortified this school of thought. With the development of positivism and Darwinism, during the nineteenth century, and Freudianism and logical positivism, during the first half of the twentieth century, the status of religion was weakened in the scientific circles.

But, with the damage done to human societies in the first and second world wars and because of the development of some schools of the philosophy of science in the second half of the twentieth century, it became clear that science per se cannot answer humanity's ultimate questions and cannot even justify its own success. It also become clear that science by itself cannot prevent its misuse in human societies and damages to the environment. Thus, from 1960's on we see the return to religion in some scientific circles. For example, Ian Barbour wrote his well-known

book on science and religion in 1960's, in which he classified the relation between science and religion into four categories, and Charles Town, a Nobel laureate in physics, wrote an article on the convergence of science and religion.

Gradually, we see the appearance of books and journal and the holding of some conferences on science and religion. Furthermore, during the early 1990's, Templeton Foundation assigned some prizes for courses presented on science and religion, a program which was carried out in many countries of the world.

Many fruitful research activities have also been done in the area of science and religion in many universities of the world since 1990's, and many research institutes were established in the universities of the West. In addition, the Association of Christian Philosophers, with thousands of members, was founded. Furthermore, the hostility between science and religion changed to interaction between them. In addition, some of the eminent scientists, who did not show up their religious attachment before, now explicitly defended religion. Now, although the atmosphere of western countries are predominantly secular, many eminent scientists explicitly manifest their religious attachment and reply to the challenges of atheists. It is also interesting that although Soviet Union fought religion explicitly, it could not destroy Orthodox church there, and even the science-religion courses of John Templeton foundation were offered there.

Thus, contrary to the promise of many atheist scientists

that religion would leave human life, it has returned with more strength, and many eminent scientists have involved themselves to defend religion against the challenges of atheists. Unfortunately, this positive wind has not reached many Islamic countries.

The present book is an effort to respond to the challenges against monotheistic religions, presented by contemporary atheist scientists. It is based on the following two science-religion courses that I taught at the Philosophy of Science Department of Sharif University of Technology (in Tehran, Iran):

The first course was offered in 1995 in response to John Templeton Foundation's project for the teaching of a science-religion course, and received John Templeton Foundation's Prize. The second one was a more advanced course on science-religion that I thought there in 2017.

The book shows that in many problems, in the field of science and religion, there are many commonalities between scientists and philosophers belonging to monotheistic religions, i.e. they have almost the same worldview.

This book starts with a discussion about the relation of science and religion in the Islamic world and in the west. Then, we have argued for the inadequacy of science per se for answering humanity's ultimate questions and also some questions which are presented in science. Then, we have argued for the possibility of a common culture between science and religion. This is followed by the discussion of some challenges that are brought up against

monotheistic religions: God's existence, creation of the world, miracles, presence of evils, purposefulness of the world, resurrection, relation of science with values, religious science, and the necessity of a comprehensive worldview ruling over future science.

I would like to offer my sincere thanks to the honoable president of Al-Mustafa International University, Hojat-ol-eslam Dr.Ali Abbasi for accepting to publish this book by Al-Mustafa Publication Department, And to Hojat-ol-eslam Dr.Mustafa Novbakht(Manager of Al-Mustafa International Publication and Translation Center) for his sincere concern and effort for the publication of the book.

Mehdi Golshani

Tehran, The Islamic Republic of Iran

30 September 2023

| CHAPTER ONE |

SCIENCE-RELIGION RELATION IN THE ISLAMIC WORLD: IN THE PAST AND AT PRESENT

1) The concept of science in Islam

It is narrated from **the prophet of Islam** that

> *"Acquisition of knowledge is incumbent on every Muslim" (1)*

In the Islamic tradition, there has been different views about the concept of knowledge. Some scholars have confined to specifically religious kind of knowledge, but many scholars have had a much broader view. In my book "The Holy Qur'an and sciences of Nature", I have argued that the knowledge under consideration in Islam includes a wide spectrum. In fact, any knowledge who brings us closer to God is considered as useful knowledge. Some Islamic traditions confirm this view. For example, it is narrated from **the prophet**(S) that:

> *"Seek knowledge even in China" (2)*

And it is narrated from **Imam Ali**(A) that

> *"knowledge is the lost property of a believer. Thus, seek it even from a polytheist." (3)*

These traditions indicate that the knowledge recommended in Islam is not restricted to specifically Islamic sciences. Besides, this was the understanding that Muslim scholars

had in the early centuries after the prophet(S). It was for this reason that they took the translation of scientific books from other nations seriously.

2) The causes for the development of Islamic Civilization

George Sarton, one of the eminent historians of science, reports that Muslim carried the leadership of science for 350 years, and for 250 years they shared this leadership with Christians, and some of the pioneers were not Muslims. In his book "Introduction to the history of science", Sarton names each 50 years, of those 350 years, by the name of one Muslim scholar, in the following way: (4)

750 – 800 (Ac)	: Jaber ben Hayyan era
800 – 850	: Kharazmi era
850 – 900	: Razi era
900 – 950	: Masoudi era
950 – 1000	: Abulvafa era
1000 – 1050	: Birouni era
1050 – 1100	: Khayyam era

In the next 250 years, too, there appeared some first rate Muslim scholars like Nasir al-Din Tousi, Ibn Rushd and Ibn Nafees, and some eminent Christian scholars like Roger Bacon.

In Sarton's view to understand the reason for the glorification of knowledge in Islam, one has to consider the axial role of the Qur'an.(5). The understanding of Muslim scholars from the Qur'an was that they should study nature to become familiar with God's handiworks in nature. Various science

were considered to be different pages of the book of nature. Thus, **al-Biruni** said:

> *"sight is for learning from God's wisdom in the creation, and to argue from the creation to the Creator." (6)*

Here, we want to go over what caused the glorification of sciences in the Islamic world.

(a) The Encouragement of the Qur'an and Islamic Tradition for Learning

The Qur'an repeatedly asks people to reflect of God's creation and to avoid superficial encounter with God's signs in nature:

> *"Say, observe what is in the heavens and the earth." (Yunus/101)*

C. A. Nalino, an Italian Historian of science, mentions that what encouraged religious people to astronomy was the Qur'anic verses that talked about the benefits of heavenly bodiesandtheirmotion,andaskedpeopletoreflectonthem.(7)

(b) Encouragement for Seeking Knowledge from Any Source

The Qur'an and Islamic tradition encourage Muslims to seek knowledge from anywhere. Thus, we read in the Qur'an that:

> *"So, give good news to My servants who listen to the word and follow the best of it." (al-Zumar/17)*

According to **Mirdamad**, the reason that Hisham bin Hikam (A Shia Muslim) studied under atheist Aboushakir was the prophetic tradition that:

> *"Wisdom is the lost property of a believer. Thus, he seeks it from anywhere he finds it." (8)*

According to Mutahhari, An Iranian philosopher, the Shia Imams did not objected to the translation of scientific books to Arabic from other languages, in spite of their disagreement with Abbasi rulers. (9)

Georgy Zaidan, a Christian historian, says in his book on the history of Islamic civilization that:

> *"Muslim scholars went to study with Christian and non- Christian scholars, with humility. Thus, Abu Nasr Farabi went to study some sciences under a Christian of Harran." (10)*

Many Muslim scholars went to far places to study under distinguished scholars. Ibn Khaldun, a distinguished Muslim scholar, encourages travelling for learning deep and extended knowledge. (11)

(c) Honouring of Scientists

The emphasis of the Qur'an and Islamic tradition on honouring scholars had much effect in Muslims seeking knowledge. Even the people of the book (Jews and Christians) were honoured. When Seyyed Razi, who was a distinguished Shia scholar, praised his teacher Abu Ishaq, who was a non-believer in religions, people objected to him. But he responded that he had actually praised knowledge. (12)

At Maragha observatory, Tusi invited scholars from various countries, including China. For example, Foo Mun Ji, of China, taught Euclidean geometry and Ptolemi's book on astronomy.

(d) The Ruling of Tolerance

The ruling of tolerance among Muslim scholars in those days caused the opening of exchange of ideas between the scholars of different schools of thought. This was encouraged by the Qur'anic instruction to have good dialogue and take the best. Therefore, various groups were living together, and there was good collaboration between Muslims and non-Muslims in advancing science.

(e) Following Logical Reasoning

Islam has prevented its followers from blind imitation and inappropriate prejudices, and has asked them to follow logical reasoning:

> *"Do not follow. That of which you have no knowledge. Indeed, the hearing, the eyesight and the heart-all of these are accountable." (al – Isra/ 36)*
> *"... say, Produce your evidence, to be truthful" (al – Bagarah 111)*

and in arguing with the people of the Book, God recommends doing it in the best manner:

> *"Do not dispute with the people of the book except in a manner which is best." (al – Ankabut /46)*

Imam Sadiq, one of the Shia' Imams, defines the unreasonable way of arguing in the following way:

> *"The unpleasant argumentation is to refute somebody's belief without reasoning or deny him a right, just because you are afraid that he might use it against you...In this case you are like him. He has denied a right and you are denying some body else's right." (13)*

Imam Ali once said: Ask me before you don't find me. An Arab jew said: "O, the ignorant and the one who talks without knowing, I have some questions. People, arose to silence him. But **Imam Ali** said:

> *"By force you cannot present divine proofs and show divine arguments." (14)*

It was due to this behavior that during the glorious days of Islamic civilization, discussion between Muslims and non-Muslims was prevalent, and logical argumentation was popular. Thus, **Avecinna** said:

> *"Any one who confirms something without reasoning he has fallen apart from human innate character." (15)*

(f) Seeking the truth

Islam has emphasis on seeking the truth, and recommends that Muslim should seek the truth even if it is against their profits. Thus, the Qur'an blames those that are not seeking the truth:

> *"We certainly brought you the truth, but most of you were averse to the truth" (al – Zukhruf / 78)*

And the **Prophet** (S) said:

> *«There is a light in the heart that does not shine, unless one follows the truth." (16)*

It was due to the recommendations of Islam for following the truth, that Muslim scholars had emphasis on it. Thus **al – Kindi**, the first Muslim philosopher, said

> *"It is befitting to seek the truth through whatever source available: Because, nothing is more worthy*

for a seeker of the truth than the truth([itself]).” (17)

M. A. Shahrestani wrote a book in which he criticized Avecinna for certain issues. Nasir al - Din Tusi wrote a book in his response, and mentioned that the reason behind writing this book is not to defend Avecinna and criticize Shahrestani; rather, his intention was to defend the truth.

(g) Hard Work of Muslim Scholars in Seeking Knowledge

One of the other reasons for the glorification of sciences in the Muslim societies was the hard work of Muslim scientists in seeking knowledge. So, they did any kind of acclivity for solving a problem or finding a suitable teacher. The age would not stop their activities. Here, we mention some examples.

• Zakarya Razi, wrote a book when he was quite old. It took him 15 years to finish that book. He did so much handwork that his seeing became weak and one of his hands lost his ability, but he did stop his work. People were reading and writing for him. (18)

• Al-Biruni went with Sultan Masoud to India, and he stayed there for a couple of years and became friend with Hindus, and learned their Sanskrit language and their traditions, and then wrote a book, which is still one of the best sources on old India.

• Masudi, one the most eminent Muslim geographers, was born in Baghdad, but he traveled to Syria, Palestine, Saudi Arabia, Tanzania, Iran, Middle Asia, India and up to China Sea. Then he gathered his travels› memories in

30 volumes, which was then summarized in 4 volumes. In these books he describes his various observation about the places that he visited and the habits and the sciences of the lands.

These scholars tried to train their students in the same way.A student of al-Biruni describes that al-Biruni didn't appeal to examples in his books. So, when he was asked for the reason for this, he said that he wanted the readers of his book use their minds. But, as far as those who doesn't have this character, he would not mind if they don›t understand his book. (19)

(h) The Unity of Sciences in Islam

In the Islamic outlook the criteria for desirability of a science is its usefulness, in the sense that it would lead one to God and His consent. Any kind of knowledge which has this property is desirable and is a kind of God's worship 'and there is no difference between specifically Islamic sciences and other branches of knowledge. It was with this mentality that Muslims sought all kinds of knowledge. Many of the Muslim scholars were not only expert in specifically Islamic sciences, but they were experts in natural and mathematical sciences too. In the view of those scholars the goal of sciences is the cognition of all signs of God, and each science represents one dimension of God's Handiworks. Thus, various sciences are not detached from each other; rather, they are like the branches of a tree.

The idea of the unity of the creator and cohesion of the creation was a ruling principle in their mind. The Islamic

art shows the referral of plurality to unity, and the Islamic science shows the unity of the management of the creation. Thus, Muslim thinkers did not separate natural sciences from their religion, and were after plans through which they could explain the whole universe. Thus, they even sought those fields of knowledge that did not have any financial benefits. An important aspect of their scientific work was that they tried to put all of their knowledge under the umbrella of Islamic worldview.

3) The causes of Decline of Science in the Islamic World

After several centuries of the glorification of science in the Islamic lands, science underwent a decline. Several causes have been mentioned for this decline:

-The attack of Mongols and Christians on the Islamic lands.

- Belief in the conflict between Islam and natural sciences
- The growth of mysticism

In my view, the most important cause of the decline of sciences in the Muslim lands was the growth and ruling of Asharite school of theology. With the ruling of this school, the free discussion between religious scholars and scientists and philosophers became very limited, and scholars came under serious restrictions, including jail or exile.

Of course, in the lands under the control of Ale – Buyeh and Samani›s, there was more freedom. But with the prevailing of Asharites, in most of Islamic lands, scholars

came under pressure and the teaching of natural sciences and philosophy became restricted to private teachings. Asharites believed that the only kind of knowledge to be learned is restricted to the teachings of the Qur'an and the Islamic tradition. For example, **Ibn Taymiyah** said:

> *"The knowledge reached through the prophet(s) is the thing which deserves the name of knowledge. Other teachings are either not beneficial knowledge, even if it is called knowledge. But, if it is a beneficial knowledge, it would have come in the inheritance of the prophet." (20)*

With the appearance of al – Ghazali, who was both an Asharite and a mystic, scholars, especially philosophers, went under more pressure.

During Ghaznavi and Saljoughi rules, there was more pressures on the carriers of rational sciences, and the teachings in the formal schools became restricted to religious teaching. Thus, **Ghazali** said about the natural sciences:

> *"In natural sciences, truth is polluted by falsehood, and right is similar to wrong." (21)*

Ghazali›s view about mathematics was that even though mathematics itself does not involve evils, but since it could be used as a prelude to sciences that involve evils, it should be avoided. (22)

This opposition to rational sciences has continued in some of the Islamic lands.

In the last hundred years some Western scholars have written extensively about the status of sciences in the

Islamic lands and have given their views about why modern science did not start in the Islamic lands. Here, I mention their views and my criticism of them.

(a) Some Western scholars have said that the reason that modern science didn't start in the Islamic lands is that Muslims attribute everything to God, and they don't believe in secondary causes.

This claim is not generally true, and the negation of secondary causes was only due to Asharites. This school of thought was dominant for several centuries and suppressed its opponents. But all Muslim philosophers and other schools of theology believed in the secondary causes.

(b) Some Christian scholars attribute the development of modern science in the West to Christian theology. The scholars of the 16th century were committed Christians that saw their duty to understand God's Handiwork. Furthermore, the Islamic world lacked some of presuppositions of science. But exactly the same presuppositions have been present in the Islamic outlook and has been emphasized by Muslim scholars. The Qur'an and Islamic tradition have emphasized the study of nature. Furthermore, most of the eminent scholars of the Islamic civilization era have explicitly mentioned that their motif for the study of nature has been for the sake of understanding God's handiwork.

(d) Some Western scholars claim that science did not start in the Islamic lands, as Muslim scholars were prejudiced about their past heritage and did not have

the courage to go beyond them.

This claim is far from the truth. Objections of Razi to Jalinus and Biruni to the physics of Aristotle and innovations of Ibn Haytham in optics are good witnesses for our claim.

Razi wrote a book in which he disputed some of the claims of Jalinus and in response to those who objected to this works said:

> *"The fields of Medicine and philosophy do not admit submission to authorities and acceptance of their views, or accompanying them, and not going beyond them. In the same way a philosopher does not like this kind of behavior from his students and those who lean from him." (23)*

Ibn Haytham too wrote a book in which he disputed some of the claims of Ptolemy and said:

> *"Truth is desirable inherently. Thus, the seeker of truth is not the one who only looks at the books of pioneers... rather, the seeker of the truth is obedient to logical reasoning." (24)*

If this mentality had continued, the Muslims would have been the pioneers of modern science.

Some Western scholars claim that Muslim scholars did not have rational capacity for innovation. Their only role was the transfer of Greek science to the Europeans of the Middle ages. The principal scientific work of Muslims was in applied science and did not lead to useful results. In the words of **Bertrand Russell**:

> *«Mohammedan civilization in its great*

days was admirable in the arts and in many technical ways, but it showed no capacity for independent speculation in theoretical matters. Its importance, which must not be underrated, is as a transmitter» (25)

According to Russell, Muslim scholars were primarily the interpreters of Aristotle and New Plotonians. But, the claim that the scientific word of Muslims was primarily experimental is not right. In fact, some Muslim scholars did some of the most abstract works in science. It is enough to look at the works of Ibn Haytham in optics, Khayam in Mathematics, or Tusi in Astronomy. For example:

- Khayyam and Tusi disputed the fifth principle of the Eucledean geometry.
- Ibn Haytham disputed some of the claims of Ptolemy in optics and presented some new results.
- Kharazmi had some new results in algebra

In short, the main motivation for the development of science in the Islamic lands was the strong recommendation of Islam for the study of nature.

This lead to the glorification of sciences in the Islamic World. But the raise of some anti – rational schools, that ignored the Qur'anic emphasis on the study of nature, led to the decline of science in the Islamic land.

4) Science in the Islamic Lands in Modern Era

After the Mongol era, the Islamic World was not only inactive in natural sciences but it was also unaware of what was happening in the West. During Safavi ruling,

which was contemporary with the start of modern science, only religious sciences and philosophy were relevant in Iran, and in the rest of the Islamic World philosophy was ignored. During the Qajar ruling, modern science reached Iran and some other Islamic countries. Furthermore, in Iran and some other Islamic countries students were sent to Europe to learn modern science: These people transferred modern science plus its philosophical attachments to their countries: In this period some secular scholars in Iran, Egypt, etc. wrote books and propagated positivism; people like Georgy Zaidan, Salamh Musa, Shomaiel. These currents appeared in Egypt, Lebonan Iran, and India.

In India seyyed Ahmad Khan, tried to propagate modern science in the first half and second half of twentieth century. He established a university in India, translated some Western books into Urdu language. His remedy for the backwardness of the Islamic world was complete submission to the Western science and reinterpretation of Islamic teachings in terms of Western science

In Iran too some intellectuals, like Tagizadeh and Malkam Khan appeared, which preached for complete submission to the West.

Several currents appeared in the Islamic World to confront the secular current:

• Some Muslim scholars tried to show that the Qur'an is compatible with modern science, and even some of the findings of modern science was predicted by the Qur'an. For example, they argued that the movement of the earth

around the sun, Newton's law of gravity, duality in nature, and the expansion of the universe was predicted by the Qur'an. But, this current of thought refused philosophy and considered empirical knowledge the key to the solution of religious issues.

• Some Muslim scholars preached positivism and considered empirical knowledge the only key to the understanding of nature and believe that the main cause of our backwardness has been our attachment to philosophy. In positivism, there is no room for metaphysics. Thus, in the Islamic countries, the scientific environment was confronted with a dualism. On the one hand, they tried to conserve their Islamic values and on the other hand they were confronted with teachings in which there was no room for God. Some scientists chose to leave religion and some tried to keep them separate, without concern for their philosophical implications. It was ignored that each scientific theory has a heavy load of metaphysical presuppositions (26)

• Another current started with Muslim philosophers who emphasized on the importance of scientific findings, but they also had attention to the metaphysical attachments of modern science, as it is due to the metaphysical presuppositions that one is lead to a theistic or atheistic interpretation of modern science. (27)

At the moment the ruling mentality in the universities of Islamic countries is scientism and ignoring philosophical thought on science. They believe that empirical science is the key to the solution of our problems and only for

things like morality we should go after religion. But they are ignoring that:

• Science itself needs a metaphysical justification for its presuppositions.

• Western science has brought much blessing for mankind, but it has also had some disastrous results.

• Science carries a heavy load of metaphysics.

• There are many questions that arise in science, but science per se cannot answer them.

In short, the Islamic world, at the moment, is confronted with several problems:

(a) There is the prevalence of positivism and a thrust for the transfer of Western technology in the Islamic world, without preparing the scientific grounds for it, or thirst for innovation.

To care this scientism, Muslim scholars should explain the limits of empirical knowledge and the fact that science and religion could be brought under the same umbrella, and that science has no justification without metaphysics. They should also clarify the fact that empirical science cannot solve all of our problems.

It should also be explained that the denial of philosophy is a sort of philosophy, and those who want to explain everything by science are mistaken:

(b) At the moment, Islamic societies have lost their identity. Western thought has changed Muslim's mentality to the extent that they don't look at the world with a Muslim eyes. Muslim scholars should fight this inferiority complex in their societies.

Sources

(1) Kuleini, Muhammad bin Ya›qoub, Al-Osoul min Al-Kafi (Beirut, Dar Sa›b, 1401 H. Q.), p. 30.

(2) Fattal Neishbouri, Rowzah al-Vaezin, Vol. 1 (Qum: Moassesah Al-Razi, 1386 H. Q.), p. 11.

(3) Ibn Abd Al-Bir, Jamea› Bayan Al-Ilm va Fadleh, Vol. 1 (Beirut: Moassesah Al-Kutub Al -Thaqafiyah, 1405 H.Q.), p. 122.

(4) Sarton, George, Introduction to the History of Science, Vol. 1(Baltimore: Carnegie Institution of Washington, 1927), pp. 520-783.

(5) Ibid., p.5.

(6)Biruni, Aboureihan , Al-Jamahir fi Ma›refah Al-Javahir (India: Heidarabad: Matbaa› Jameiyah Daerah Al Maa›hrif Al-Osmaniyah, 1335 H.Q.), p.5.

(7) Nallino , Carlo Alfonso , The History of Islamic Astronomy , Persian tr.· ((Tehran: Bahman Publications, 1970), pp. 288-289.

(8) Mir Damad, Muhammad Baqir, Al-Ta›liqah Alal-Kafi, ed. by S, M, Rajaei ((Qum: S. G. Mirdamadi,1403 H.Q.). p. 171.

(9) Mutahhari, Murtaza, Ta›lim va Tarbiaat Dar Islam (Sadra Publications, 1994), p.188.

(10) Zeidan, Georgy, Tarikh Tamaddun Islami (Tehran: Moa›ssesah Chap va Intesharat Amir Kabir, 1966), p. 586.

(11) Shalbi Ahmad, Tarikh Amouzesh Dar Islam, tr. bt M.H.Saket (Tehran: Daftar Nashr Farhang Islami, 1982),p.253.

(12) Davani, Ali, Seyyed Razi Mo›lef Nahjul Balaqah (Qum: Daftar Nashr Islami, 1985), pp. 101-103.

(13) Tabarsi, Ahmad, Al-Ihtejaj, Vol. 1 (Mashhad: Nashr Al-Murtaza), pp. 21-22.

(14) Majlesi, Muhammad Baqir, Bihar Al-Anvar , Vol. 57 (Beirut: Dar Ihya Al-Turath Al-Arabi, 2005), pp. 231-232.

(15) Sad A-Din Sirazi, AlHikmah Al-Mutaa'liah Fi Al-Asfar Al-Arbah Al-Aqliyah, Vol 1 (Beiruth: Dar Ihya Al-Turath Al-Arabi,), p. 362.

(16) Majlesi, Muhammad Baqir, Bihar Al-Anvar , Vol. 2, p. 265.

(17) Fakhri, Majid, Tarikh Al-Fasafah Al-Islamiyah, tr. by K. Yazegi

(Beirut: Al-Jamia› Al-Amerikiyah,1979) p. 111.

(18) Be›mah, Abdullah, Falasifah Shiah, tr. by S, J. ghazban (Tehran: Sazman Intesharat va Amozesh Inqelab Islami , 1988), 313.

(19) Al-Shabi, Ali, Zendegi Nameh Biruni, tr. by P. Zukaei (Tehran: Intesharat Vezarat Farhang ve Honar, 1973), 122.

(20) Safa, Zabihhullah, Tarikh Uloum Aqli Dar Tamadun Islami (Teran: Intesharat Daneshgah Teran, 1952) p. 139.

(21) Ghazali, Abou Hamid Muhammad, Maqasid Al-Falasifah (Cairo: Dar Al- Maa›rif be Misr, 1961), p.32.

(22) Safa, Zabihhullah, Tarikh Uloum Aqli Dar Tamadun Islami, p.149.

(23) Razi, Mihammad bin Zakariyah, Al-Shukouk Ala Jalinous , (Teham ;Intesharat Daneshgah Tehran, 1993) , p. 1.

(24) Ibn Heitham, Hasan, Al-shukouk ala Batlamious (Egypt, Matba›h Dar A l-kutub, 1971), p. 3.

(25) Russell, Bertrand, The History of Western Philosophy (New York: Simon & Schuster, 1945), p. 427.

(26) Golshani, Mehdi, From Physics to metaphysics (Tehran: Institute for Humanities and Cultural Studies, 1997).

(27) Golshani, Mehdi, Issues in Islam and Science, Ch. 3 (Kuala Lumpur: Amin Research and Cultural Centre, 2012).

| CHAPTER TWO |

SCIENCE AND RELIGION IN EUROPE IN THE MIDDLE AGES AND IN RECENT CENTURIES

Aristotelian Worldview

Aristotle considered this world to be an orderly one, which is governed by the first mover. The lack of apparent variation in the skies was considered by him to be due to their eternality. During the sixth century after Christ John Philiponus, a Christian philosopher, believed that everything is made of one kind of matter and is ruled by one law. He rejected the idea of eternality of matter. He believed that after creation, God left the generation of elements from each other and the generation of things, from elements to the whole nature. (1)

Middle Ages

In the middle ages, there was much attention to the final causes too. Because they believed that in the hierarchy of existence, everything has a proper place, because it is generated by a God who has purpose.

In the middle ages the first mover of Aristotle was replaced by Christianity's Omniscient and Omnipotent God. The Architect of adapting Christian theology with Aristotle's Philosophy was Thomas Aquinas. He believed that theology and philosophy cannot be in contradiction.

Thus he tried to adapt Christian theology with Aristotle's philosophy. He considered revelation necessary, as the most important points of theology are not available for human beings.

In Aquinas view, human intellect leads to faith and can understand some of the facts of theology. He introduced the final cause argument for God's existence, in which one is lead from the order in nature to an Omniscient Omnipotent being. He also introduced the cosmological argument for God's existence, in which one goes from the creation of the world to the Creator. He also suggested the design argument.

Aquinas considered God as not only the Creator of the world, but also its Governor. He directs everything to its destiny. He usually acts through the natural intellect, but in the case of miracles he shows His power.

The beginning of the modern science.

It was during the 17th century that modern science started. The main characteristic of this science was the combination of mathematical reasoning and experimental observation.

In the modern science, the teleological explanation of the world was replaced by the descriptive explanation: Galileo was not after finding why things fall, but after how they fall. Of course, these scientists did not deny the existence of a telos for the world, but they believed that teleology should not have a role in the scientific description.

The books "Dialogues" by Galileo and "Mathematical

principles of natural philosophy" by Newton were turning points.

Galileo considered the world to be made of particles that have mass and velocity. He considered these two to be primary qualities, which are independent of the observer, and are distinct from secondary qualities, such as color or smelling. The latter are reactions of the human mind towards the external world.

Galileo was a religious believer who did not see any conflict between his religious and scientific beliefs. In his view, the sacred book, talks about spiritual matters, not about scientific facts. The spiritual matters are beyond the intellect and argumentation and are useful for human salvation. Galileo believed that God is the author of both the book of Nature and the book of Scripture, and these two sources of knowledge cannot be in conflict.

In the **Galileo›s** view, to study nature we should use our intellect as well as our senses:

«God who has endowed us with senses, reason and intellect...would not require us to deny senses and reason in physical matters which are set before our eyes and minds by direct experiences or necessary demonstrations.» (2)

Galileo's trial, which was due to his support of Copernicus sun-centered theory, prepared the ground for the separation of scientists from the church. During Galileo's trial, Cardinal Belarmine suggested that Galileo interprets Copernicus theory in an instrumentalists› way, and not as a real description of reality, as Osiander had taken this position in the introduction to Copernicus book.

But Galileo did not accept.

The Mechanical picture of the world, that Galileo had started was developed, in the second half of the 17th century, by Newton.

In Newton's Picture, the world is like a complex machine, which follows unchangeable laws and its details are predictable. Newton considered this mechanical world to be the creation of a Wise Creator and it represents His aims. But Newton still left some room for human spirit and God's interference in the world.

Another view about God's role in the world was the case of a clock maker, which Boyle used, being inspired by Strasbourg famous clock. This model had the problem that a watch, after being made, works independent of its maker, but Boyle considered the continuous support of God to be necessary.

God of gaps

One of the arguments for the existence of God was appealing to gaps in the scientific explanations. Whenever they felt a problem, they appealed to God. Newton, himself, did not want to restrict God's action to the initial creation. Thus, e. g., he suggested the interference of God in keeping the status of solar system. But Laplace argued the status of solar system could be saved without any appeal to God.

On the other hand, Leibnitz did not accept the role of repairing for God, and considered such a God without wisdom. But the appeal to God of gaps was not left aside

completely. For example, Lord Kelvin appealed to God for the explanation of the stability of atoms. Maxwell, too, did not attribute the constancy of the properties of atoms and Molecules to natural agents. (3)

The existence of order in nature

But, instead of appealing to God of gaps, many scientists and philosophers have appealed to the existence of order in nature to prove the existence of God. The lawfulness of nature is visibly seen in the laws of physics, and with the passage of time, the universality of these laws have been shown more and more.

That the existence of order in nature and its lawfulness is a sign for the existence of God, was something that all originators of modern physics
(Copernicus, Kepler, Galileo, Newton, ...) believed in. For example, **Newton** said:

> *«This most beautiful system of the sun, plants, and comets could only proceed from the counsel and dominion of an intelligent and powerful Being.»(4)*

and

> *« Does it not appear from phenomena that there is a being incorporeal, living, intelligent.»(5)*

Why classical physicists believed in the study of nature?

Most of the classical physicists have explicitly admitted that their main motive in the study of nature was to

discover God's secrets in nature and the glory of God's creation. For example, **Leibnitz** said:

> *« It is especially in sciences...that we see the wonders of God, wisdom and goodness...; that is why, since my youth, I have given myself to the sciences that I loved.» (6)*

and so was **Boyle**:

> *"[Science is a religious task], the disclosure of the admirable workmanship which God displayed in the universe." (7)*

and **Oersted**:

> *«Every fundamental investigation into nature must issue in a recognition of the existence of God.» (8)*

Faraday considered the gravitational and electrical forces as indications of God›s power and wisdom. (9)
and Maxwell said the same thing in one of his prayers. (10)
and J. J. **Thomson** (in his 1909 lecture):

> *«In the distance tower still higher picks, which will yield to those who ascend them still wider proposals and deepen the feeling whose truth is emphasized by every advance in science that ‹great are the works of the Lord› « (11)*

But in the generation after Thomson, this kind of attitude became less popular, and people like Rutherford or Bohr, did not talk this way. The reason was the rise of schools like positivism during the second half of the 19th century

and the first half of the 20th century.
In the beginning of modern science, scientists were willing to relate some of the laws of physics to God's wisdom. For example, Maupertuis related his least action principle to God's wisdom, in choosing the simplest ways (12).
But this kind of attitude, in adapting physical principles with God's wisdom, came under criticism.

Why new science started in Europe?

It is a frequently asked question as to why new science started in Europe? Why Greeks and Chinese, which had some important developments in mathematics and industry, respectively, did not get access to the new science before Europeans?
It is argued that a collection of ideas are needed to go after scientific searches. Science does not progress without some presuppositions and these, in turn, depend on the cultural conditions in which a scientist lives. The difference between the West and Chinese was in the worldview which governed over their societies. Joseph Needham, which had much studies about the status of science in China, asked this question: Why Chinese of the middle ages, which had some technical progress, could not get access to scientific laws. The response that he found was that Chinese did not have faith in understanding nature, whereas one of the most important presuppositions of all sciences is the comprehensibility of nature (13).
Furthermore, the teachings of Confucius was ruling over Chinese society, and those teachings had emphasis on

ethics and social behavior and not on ontology. So, they had no motive for finding universal laws, where as Galileo believed that the laws of the heaves are the same as laws of the earth. The Western religious belief was that there are universal laws and we should try to discover them. Of course, Muslim scientists, too, believed in the lawfulness of nature, and for that reason tried to discover them.

In fact, the philosophers of middle ages, who were under the influence of the Scriptures, believed that

- The world is good, as it was created by a benevolent God.
- The created world is rational, as it was created by a rational God.
- The world is lawful, as it is said in the book of wisdom that God has created everything with proper size.
- The world is comprehensible for human beings, because God has ordered that human beings make use of the earth and God does not order the impossible.

Therefore, **Whitehead**, a Well-known contemporary philosopher, considered the new science to be the result of the Theology of the middle ages. (14)

But, whereas modern science was developed by the believing Christians, with the development of empiricist school of thought, philosophers and scientists of the 18th and 19th century tried to ignore religion. **Hume**, Auguste Comte, Darwin, Freud, etc were pioneers of this development.

The growth of secularism

The success of Newtonian physics in explaining the

behavior of physical systems, fortified the reliance on human intellect, so that many scientists believed that through science they can get anything they want. This affected the status of theology, and the role of religion became confined to the domain of ethics. So, Laplace claimed, during the 19th century, that the solar system is stable and does not need God's interference. Then, when Napoleon asked Laplace why he did not mention God's name in his book, **Laplace** replied that:

«I had no need of that Hypothesis.» (15)

During the 19th century, classical physics reached maturity, and with the emergence of Darwinism, some scientists claimed that natural selection can lead to order, without needing a designer.

The emergence of some philosophical schools, like positivism, led to the idea that science can play the role of religion, a religion in which the intellect plays the role of God and the universities are places of worship, and professors play the role of priests. This scientism led to the prevalence of the view that science can explain everything and there is no need for God.

There were also other reasons for the growth of scientism:

(a) The failure of the appeal to the God of gaps.

(b) The spectacular success of the Newtonian physics in explain a large number of phenomena.

Thus, religious people became silent, and although they believed in God, they did not disclose their faith in their books and articles. Furthermore, reductionism was promoted, i. e. all phenomena are finally explainable by

the laws of physics.

The prevalent attitude was that science and scientific progress can bring happiness for mankind, and human beings can make an earthy paradise for themselves. Anatole France, a well-known French poet and novelist, remembers that during his youth, it was a common idea that science can provide an ethical system, social laws, constitutional laws, and everything else. (16)

(c) Challenges to the design argument and other arguments for the existence of God, by philosophers like Hume, caused the decline of metaphysics in the academic circles Here, we mention some of the ideas of philosophers and scientists who caused the decline of metaphysics.

Hume (1711-1766)

Hume believed that the only reliable knowledge of human beings are those that are rooted in sense experience. He did not believed in causality, and considered the belief in causality to be rooted in our habits. Although we refer similar effects to similar causes, but there is no similar for the whole world. Science deals only with limited capabilities, not with the beginning or end of the world. He denied a first cause for the world. He rejected the design argument, and mentioned that if there is an order in the world, the designer is in the world, not outside of it. He also criticized the reliance on the intellect in all areas and did not believe that from some observations we can get general laws. He denied inductive reasoning and considered the appeal to induction to lead to circular reasoning.

Kant (1724-1804)

Like Hume, Kant believed that the valid knowledge is obtained through human senses. But he believed that our mind affects what is received through our senses.

In Kant's View, the origin of religion is in human beings› sense of ethics, not metaphysical issues. Kant believed that God is a principle of the ethical system. In his view, the acceptance of ethics requires the acceptance of some relation between virtue and a good destiny. Thus, we are led to a being who guarantees just rewards in the hereafter. In Kant's view, science and religion are separate domains, and there is no conflict between them. Science has complete freedom in its discoveries, and the role of religion is ethical guidance. (17)

Auguste Comte (1798-1857)

With Auguste Comte, scientism became prevalent. He wanted to be the supreme authority in science and also a social prophet. He considered those properties of matter that are not sensible to be non-scientific, and considered effort for their discovery to be irrational. He could be considered the formal propagator of positivism.

In the domain of physics, Comte believed that any non-sensible thing to belong to metaphysics, and any discussion about it to be irrational. He considered those who were after the causes of things to be an idolater

J. J. Thomason, refuted the idea of neglecting none sensibles, and considered those who believe in them to have both bad physics and bad metaphysics, and added:

«I hold that if the introduction of a quantity

promotes clearness of thought, then even if at the moment we have no means of determining it with precision its introduction is not only legitimate but desirable The immeasurable of today may be the measurable of tomorrow.... It is dangerous to base philosophy on the assumption that what I know not can never be a knowledge.» (18)

Marxism

Marxism, which started with Marx and Engels in the second decade of the twentieth century, fortified scientism. Marx compared his method with that of physicists, and claimed that he has found some rules in natural and social sciences that are absolutely valid. On this basis, the Russian Association of Astronomers, in 1939 and 1949, rejected the idea of a finite expanding universe and insisted on infinite universe, as far as space and time is considered. (19)

Biology and Theology During 19th century

During 19th century, physics presented theories in optics, electricity and magnetism and heat, and with that concepts like field, probability and statistics entered into physics. Chemistry too, which in the early 19th century had started with Dalton's atomic theory, was developed with Mandaliof table of elements, and by the end of 19th century reached the organic chemistry. But, it was biology that mostly affected theology. The role of Darwin in biology is similar to the role of Newton in physics. But, contrary to Newton, who derived theistic conclusions, Darwin challenged the design

argument. In 1848, Darwin wrote a book about the species in which he considered new species as the result of random development of previous species; and in his 1859 book, he presented his reasons for the theory of natural selection and the compatibility of species with their environment.

The theory of natural selection involves three basic concepts:

- Random changes
- Struggle for survival
- The survival of the fittest

In 1871, Darwin wrote the book "The Descent of Man", in which he said that the difference in ethics and the spiritual abilities of man and animals is only a matter of degree.

In the hand of empiricist philosophers and those scientists affected by scientism, Darwinism became a philosophy that propagated a materialistic interpretation of the world. Darwinism has generated four problems for the Western theologians:

- Conflict with wisdom in creation
- Conflict with the superiority of human beings (since Darwinism considered humans as animals).
- Conflict of Darwinistic ethics with the religious one.
- Conflict with the teachings of the Sacred books.

Darwinism refuted the design argument, where as this argument had resisted Hume's and Kant's criticism. The criticism of Hume concerned the minor premise of the design argument (lawfulness of nature), where as Darwin's criticism of the argument concerned the major premise of the argument. In Darwin›s theory order is

generated through disorder and any kind of programming in nature is denied. In short, Darwin's theory opened the way for the accidental emergence of life.

In Darwin's Theory advanced species are produced through the development of simpler species, and the previous grounds plus the present conditions makes the emergence of other species probable.

Darwin's Theory led to the Darwinian ethics. Since in nature struggle for survival, natural selection and the survival of the fittest is ruling, the case should be the same for human beings too. In this system the elimination of the week by strong is a value. Darwin's Theory divided Christian theologians into two groups:

(a) Traditionalists

They were bound to the text of the Scriptures, and considered Darwin's theory to be incompatible with the Scriptures.

(b) Modernists

Modernists› interpretation of the Scriptures would permit them to accept Darwin's Theory. They interpreted Scriptures in a poetic way, indicating world's reliance on God.

Furthermore, some of them considered Scriptures as being a human product, and not a direct revelation of God. What supported this view was the research that indicated Scriptures had several authors.

Darwin himself was cautious in his criticism of religion, but some of his supporters, like Huxley, criticized Christianity under the banner of the freedom of science.

But, the design argument that had been weekend through Darwin's theory, has been revived in recent decades. Some scholars have expanded
the concept of design and instead of paying attention to definite organisms, refer to the whole process of evolution. They pay attention to the laws through which life has emerged.

In short, whereas the development of the Darwinian evolution and positivism during the 19th century weakened the status of metaphysics and religion in the academic circles, several developments in the second half of the 20th century changed the status of religion in the academic circles. The occurrence of two world wars during the first half of the 20th century, which lead to the killing of millions of people, and the emergence of several schools of the philosophy of science was effective in the change of attitude towards religion. This change of attitude was due to the fact that it became apparent that:

(1) Science, by itself, cannot prevent the misuse of science for humanity and earth's environment.

(2) Science, by itself, cannot answer some questions raised in science. For example, why we can understand nature? or why nature is lawful?

(3) In all scientific theories, some supra-scientific (primarily metaphysical) principles are ruling, e. g. realism or causality.

Therefore, during the second half of the 20th century some currents, in the direction of interaction between science and religion started. For example:

(a) Some institutes were established for this purpose, like "The Center or theology and the Natural Sciences" in Berkeley, or "Faraday Institute for Science and Religion", at the Cambridge University, in UK.

(b) Several journals were started in the domain of "Science and Religion" or "Science and Theology".

(c) Many science and religion coursed were taught throughout the world (including China and Russia).

(d) Many conferences were arranged, in the domain of scienceandreligion,inmanycountries.

Sources

(1) Philoponus, John, Complete Dictionary of Scientific Biography: https://www.encyclopedia.com/people/history/historians.../john-philoponus

(2) Jaki, Stanley L., The Relevance of Physics (Scottish Academic Press, 1992), p. 422.

(3) Ibid., p. 435.

(4) Ibid., p. 437.

(5) Barbour, Ian, Religion and Science (San Francisco: Harper, 1997), p. 20.

(6) Jaki, Stanley L., p. 428.

(7) Barbour, Ian. Issues in Science and religion (New Jersey: Prentice-Hall, Inc.,1966), p. 37.

(8) Jaki, Stanley L., p. 438

(9) Ibid.

(10) Ibid.

(11) Jaki, Stanley L., pp. 438-439.

(12) Jaki, Stanley L., p. 437

(13) Jaki, Stanley L., p. 419

(14) Ibid

(15) Barbour, Ian, Religion and Science, p. 35.

(16) Jaki, Stanley L., p. 496

(17) Barbour, Ian, Issues in Science and religion, pp.74-77

(18) Jaki, Stanley L.,p. 480.

(19) Heilbron, John L., ed., The Oxford Guide to the History of Physics and Astronomy (Oxford University Press, 2005), p. 312

| CHAPTER THREE |

SCIENCE – RELIGION RELATION

Introduction

Many people consider science to be objective, universal, rational, and based on firm empirical evidences, and they consider religion to be subjective, emotional and based on tradition. As far as the relation of these two is concerned, there have been various views. Here, we consider the following classification, first introduced by **Ian Barbour**:

- Conflict
- Independence
- Dialogue
-Integration

There could be cases in which a person belongs to one of these categories for certain issue, and to another category for other issues. The views of people concerning this matter is rooted in their philosophical attachments.

1) Conflict

Two groups of people believe that there is a conflict between science and religion: These are **scientific materialists**, and those that have only attention to religious texts (**Literalists**). The first group rely only on logic and empirical findings and the second group take

only the religious texts seriously. Both groups are wrong as far as the real job of science is. Materialists start from empirical date and conclude some universal philosophic claims. The other group start from the sacred texts and make some claims about some scientific subjects.

Scientific materialists have two main claims:

• Scientific method is the only reliable method of getting knowledge about the world (an epistemological claim).

• Matter is the only reality in the world (an ontological claim)

Most of the materialists believe in reductionism. This, in turn, is of two kinds:

(a) Epistemological: reductionism, according to which all laws and theories are reducible to physical ones. As **Francis Crick** put it:

«The ultimate aim of the modern movement in biology is in fact to explain all biology in terms of physics and chemistry.» (1)

(b) Ontological reductionism, which says everything is reducible to matter. In the words of **Jacques Monod**: "Anything can be reduced to simple, obvious mechanical interactions. The cell is a machine. The animal is a machine. Man is a machine." (2)

According to materialists, science starts from repeatable experiments. Then theories are made and their predications are being experimentally examined. But, in their view, religious ideas cannot be experimentally verified. In their view, science is objective, universal and progressive. But religious traditions are subjective, dogmatic, and

non-changeable. The world is eternal, is without God, and lacks any goal.

Among the deniers of religion were logical positivists, which started their work in 1920's. They claimed that only those claims that can be experimentally verified are meaningful. Thus, moral and metaphysical propositions are meaningless.

In response to logical positivists, it was said that interpretation of sense-data involve some assumptions. Furthermore, although they have apparently rejected metaphysics. But in fact, they have adopted a materialistic metaphysics.

Literalists

For Literalists, the sacred book is the reference frame and anything in conflict with it is rejected. It was this altitude that led to Galileo's conviction

After the presentation of Darwin's theory, some people considered this theory as a challenge against the sacred book, and rejected Darwin's theory. In the Arkansas law of 1981, it was said that both creationism and the theory of evolution should have equal chance for presentation in schools. Furthermore, it was required that creationism should be presented as a theory, without any reference to God or the sacred book. In 1982, A higher court vetoed Arkansas court's ruling, on the basis that it had supported a religious outlook, and was against the separation of church and the government: According to this new court order, it is up to scientific societies to decide on the status

of scientific theories, not courts. In 1987, the U. S. supreme court rejected the ruling of a Louisiana court which was in favor of creationism, as it was considered to be against the freedom of speech and was supporting a particular religious view.

2) Independence

To avoid science-religion conflict, some people have chosen the position of independence of these two spheres. In their view each one of these has its own domain and method. This position has become prevalent science Kant, who believed that theoretical intellect is suitable for the study of phenomena and practical intellect is suitable for religious issues. This group believes that science and religion differ in their goals and methods.

During the middle ages people believed that God can be understood through the sacred books and nature can be known through human intellect and observation. But in natural theology, people thought that there is a middle way, and that is the proof of the existence of God through rational arguments, as the first cause, who acts through secondary causes, which can be known through science. The believers in the independence position can, in turn, be classified into three groups.

(a) Neo – Orthodox

They believe that science and religion differ at least in the subjects, goals, and methods. Karl Barth believed that science and theology deal with different things (God and nature) and their methods are different. God, is known

through revelation, and nature is known through senses and intellect. The aim of religion is to make one closer to God and the goal of science is the cognition of the nature's structure. Thus, since science and religion differ at least in goal, method and subject, there is no room for their conflict. (3)

Thomas Torrance, has extended these differences in the following way:

- Theology is an independent science and has its own methods of research.
- In science experimentation and rational reasoning can clarify the structure of matter.
- God is infinitely higher than his creatures and we can know him only through the way he has manifested himself. (4)

(b) Existentialists

The believing existentialists believe that scientific knowledge is non –personal and objective, where us religious science is personal and subjective. The subjects of science is material bodies and the subjects of religion are personal realities and morality. God is revealed through the I – you relation, not in the scientific analysis of I – He. Science deals with objective repeatable experiments, and religion about the world order and our religious experience. Science talks about objective questions and religion about personal questions (such as meaning and goal). The authority in science is the logical consistency and empirical adequacy, and in religion is God and revelation. Science has testable predictions, and religion

has symbolic languages, because God is transcendental. Thus, the creation thesis is not a serious description about the nature's history, but is a symbolic description, indicating the dependence of God. (5)

(c) The followers of the Philosophy of Language

These are the followers of Wittgenstein. In their view science and religion are two language games, and each have their own logical categories. Morality, etc. are other language games. The aim of science language is prediction and control and the aim of religion language is worship. Different languages do differ things and are not reducible to each other. Science cannot be a criterion for all meaningful dialogues. Every language game is distinguished through the social ground it is applied. Science asks some limited questions about natural phenomena, one should not expect it to deal with everything, e.g. worldview or morality. (6)

There have been several criticisms against various schools of thought who believe in the independence of science and religion:

• Modern literalist see deliverance only through Christ, but this is in a world with various nationalities and religions.

• If God only interferes in personal matters and not in natural affairs, natural design becomes insignificant.

• Existentialism has emphasis on the personal aspects of religion and ignores its social dimensions.

• If religion deals with God and persons and science deals with nature, who can talk about both God and nature or reason and nature?

There are, however some scientists who apparently

keep their science and religion separate, but are actually practicing a conventional religion. As **Paul Davies** put it:

> *«Many practicing scientists are also religious. Following the publication of God and the New Physics, I was astonished to discover how many of my close scientific colleagues practice a conventional religion. In some cases, they manage to keep these two aspects of their lives separate, as if science rules six days a week, and religion on Sunday. A few scientists, however, make strenuous and sincere efforts to bring their science and their religion into harmony.»(7)*

Many scientists consider the job of science to be the study of nature and the job of religion to deal with moral issues. In the view of these scientists, science and religion deal with different types of questions. In science you deal with "what" and "how" questions, and in religion with "why" questions. There are also scientists that see conflicts between science and religion in some problems (e.g. in the problem of "miracles". So, they do not deal with religious considerations in their works. As **Thomas C. Emmel** (American biologist) put it:

« I feel that many scientists reach a point during their graduate student days or perhaps a little later in which they feel it is unfashionable to consider metaphysical views and so the bury their heads in the sand for the rest of their lives, not making any effort to see a perspective broader than their own immediate field» (8)

3) Dialogue or Interaction

The believers in dialogue believe that there are some grounds for dialogue between science and religion. For example, James Trefil, an American physicist, believes that some questions arise in science, that cannot be answered through science. (9). Similarly, in the case of natural laws, the question arises as to why these specific laws were chosen? A theist can say that God is the source of these laws.

Among the proponents of dialogue is Ernan McMullin (A catholic Irish philosopher) who believes that God, as the first cause, acts through secondary causes. But these two levels are different. He sees no logical connection between religious and scientific claims. But believes in a kind of soft consistency. In his view, the aim of scientists should be harmony, not logical necessity. (10)

David Tracey sees a religious dimension for science and sees science and religion to be related in the following areas:

- Moral issues in the applications of science
- Presuppostions dealing with the possibility of scientific research (11)

Furthermore, there are scientists who believe that there are certain questions in science that science, per se, cannot answer, and their response can be provided by religion. As **Arthur schawlow** (a Nobel Laureate in physics) says:

> *«It is surely right to pursue as far as possible the scientific understanding of the origins of the universe, but it is probably wrong to think that we*

have final answers and that there are no further surprises to come.» (12)

and:

«Origin questions should be pursued as vigorously as the scientists› abilities and interests can take them. But the answers will never be final, and deeper questions will eventually have to be referred to religion.» (13)

and:

«It seems to me that when confronted with marvels of life and the universe one must ask why and not just how. The only possible answers are religious...I find the need for God in the universe and in my own life.» (14)

It is a fact that since 1950, the confrontation between science and religion is declined. The reasons for this are the following

• Science not completely objective, as some scientists claim, because our information is based on some theories. Furthermore, religion is not completely subjective as some people claim. For example, science is not entirely based on argumentation and religion is not completely based on authority. Besides, the role of tradition in science is not less than its role in religion. Faith, too, is not relevant only in religion; but it is relevant in science too. For example, the faith in the existence of an ordered external world, which is understandable for us, is present in scientists. As **Planck** put it:

«Anybody who has been seriously engaged in

scientific work of any kind realizes that over the entrance to the gates of the temple of science are written the words: Ye must have faith. It is a quality which the scientists cannot dispense with.» (15)

• Theories don't arise simply by a logical analysis of empirical data; rather, the background mentality of scientists is effective too.

• Some criteria used in science, like consistency, comprehensiveness, and fruitfulness, are present in the religious thought too.

• In Thomas Kuhn's view, theories depend on the paradigms prevalent in the society, and the evaluation between theories by scientists takes place by the scientific community. Religious traditions can be considered as societies which have a common paradigm.

John Paul II , an earlier Pope, saw the collaboration between scientists and religion scholars being useful for both of them. Without this interaction, science becomes destructive and religion becomes non – conductive. Both of them should save their integrity but they should also be aware of the discoveries and insights of the other one. He recommended to Christian priests to take advantage of the methodology and philosophy of science. (16)

In short, the following benefits are seen in the interaction of science and religion:

• Through interaction, both religion and science, can avoid errors.

• Theology avoids a superficial encounter with the sacred books.

• Science remains safe from wrong generalizations.

Thus, the collaboration of these two domains and their interaction is a desirable effort.

4) Concordance or Integration

The believers in the concordance of science and religion, say that science and religion both have epistemological claims about the external world. But, we cannot live with a collection of un – related languages, if they are languages about the same world. Thus, if we want to have a consistent interpretation of all human experience, we must be looking for a unifying worldview.

For the believers in both science and religion, there are two ways.

• To keep them completely separate. Then we are dealing with men that use different criteria for different parts of their life.

• To unify science and religion, through the application of a worldview that admits to see the whole life through a single glass. In the words of **Eranan Mc Mullin**:

> *"The Christian cannot separate his science from his theology as though they were in principle incapable of interrelation. On the other hand, he has learned to distrust the simpler pathways from one to the other. He has to aim at some sort of coherence of world-view, a coherence to which science and theology, and indeed many other sorts of human construction like history, politics, and literature, must contribute. He may, indeed strive to make his theology and his cosmology*

consonant in the contributions they make to this world-view. But this consonance (as history shows) is a tentative relation, constantly under scrutiny, in constant slight shift.» (17)

In the West three major ways are suggested for the concordance between science and religion:

• Natural theology. Here it is claimed that one can conclude God's existence through some signs seen in the nature. Science has made us aware of this order.

• Theology of nature. Here the origin of theology lies outside of science, but scientific theories can help us in a new understanding of religious teachings.

• Systematic synthesis. Here, science and religion both participate in reaching a comprehensive metaphysics.

Natural Theology

In this school of thought, the arguments for God's existence are based on human intellect, not revelation or religious experience. Natural theology has always emphasized rational ways. Aristotle concluded God's existence from the existence of the world, and considered him as the first cause and first mover and manager of the world.

Aquinas followed the same way and used rational arguments for God's existence. Aquinas presented five ways for the proof of God's existence. The founders of modern science saw the coherence of nature as the result of God's design. For example, Newton mentioned that human eyes could have not been designed without the knowledge of optics. (18) In the early 19th century

William Paley mentioned many well – designed structures which are used by living organisms.

In response to Hume's criticism of arguments for the existence of God and Darwinian theory of evolution, many protestant Christians mentioned that their religion is due to their personal experiences, not natural theology. But, Catholics, still respect natural theology as it prepares them for a revelational theology.

Swinburne, a contemporary British philosopher, has an extended defense of natural theology. In his view, empirical findings don't determine a theory, but make the probability of its correctness more and more. In Swinburne's view, the existence of God has an initial acceptability due to its simplicity and because it explains the world in terms of the purposes of an agent. But the evidences of order in the world increases the probability of God's existence. (19)

In Swinburne's view, science cannot explain the existence of intelligent beings in the world. Something beyond physical laws is necessary to explain consciousness. Religious experiences, too, provide some more evidence for God's existence. Thus, on the basis of various experiences, the probability of God's existence is more than its non-existence. (20)

In natural theology, the newest argument for God's existence is the so-called anthropic principle.

During the last 50 years, astrophysicists have found that the existence of life in the world would have not been possible, if certain physical constants were different

from their present value. Thus, it seems that the world is delicately designed for the appearance of life. As we shall see later in detail, some physicists and philosophers have attributed this fine-tuning to God's design. In the words of **Ian Barbour**:

> *«Natural theology can show that the existence of God is a plausible hypothesis, but this kind of reasoning is far removed from the actual life of a religious community.» (21)*

Theology of Nature

Theology of Nature does not start from science. Rather, it starts from a religious tradition, based on revelation. But it believes that some of the religious teachings should be reinterpreted, in the light of modern science. If religious beliefs are to be consistent with the findings of science, some reforms are necessary in religious teachings. But one has to use those parts of science that have general acceptance, not those parts which are probable to change. Arthur Peacocke is after classifying traditional ideas in terms of current science. He believes that God acts through both chance and law, but does not inter into gaps. He considers chance as God's radar that goes over the cases and actualizes various potentials. He considers God as the soul of the world and the world as the body of God. (22) Ian Barbour, agrees with many points of Peacocke, but believes that in addition to pictures, we also need philosophical categories which help us to unify scientific and theological claims harmoniously. (23)

Pierre Teilhard de Chardin is another believer in theology

of nature. He is much under the influence of evolution. He talks about continuous creation and of God who is revealed in an incomplete world. His view about approaching an omega point, is a generalization of directionality of evolution, something distinguishable from Christian theology. (24)

Systematic synthesis

The aim of systematic synthesis is to get access to a comprehensive worldview. By worldview, we mean a collection of general ideas in terms of which we can interpret various experiences.

Whitehead's process philosophy is a suitable candidate for this outlook, because it involves both religious thought and scientific thought. Charles Hartshorn and John B. Cobb extended some ideas of whitehead. The impact of biology and physics on this school of thought is clear. They have emphasis both on change and correlation of events. Nature involves change, chance, novelty and order. It is incomplete and is still in the process of becoming. God interacts with the world and affects all events, but he is not the only agent of an event. Every event is the result of its past, its action and God's action. God is beyond the world, but is revealed in every event in a special way.

Process theologians deny the absolute power of God, and believe in an encouraging God, not a God of compulsion. They are after a morality that avoids humanism and pays attention to non-human beings. (25)

Barbour says that he agrees with the theology of nature, accompanied by a clever use of process philosophy. But,

he believes that too much emphasis on science (as it is in the theology of nature) or on process philosophy can cause the neglect of some of those things that are important from the religious point of view. (26)

Among those that believe in the unity of science and religion is Charles Townes (a Nobel Laureate in physics). He believes that science and religion are two different lookings on a problem, i.e. understanding ourselves and understanding the world. Religion has attention to the goal of the world as well. Townes believes that science and religion finally converge. Science is an effort for understanding the design of the world, and religion is an effort for understanding the meaning in the world. These two are not the same, but they are not far from each other, and they are related. A comprehensive worldview relates these two. (27)

As **Charles Townes** put it:

> *«If science and religion are so broadly similar and not arbitrarily limited in their domain, they should at some time clearly converge. I believe this confluence is inevitable. For they both represent man›s effort to understand his universe and must ultimately be dealing with the same substance.» (28)*

Townes mentions that sometimes physicists are confronted with some paradoxes, like wave-particle duality of light. But this does not diminish their faith in religion. But the same people, when confronted with some paradoxes in religion, lose their faith and don›t attribute it to the

limitations of humans. (29)

Donald Mackay sees science and religion as complementary. Our answers in terms of laws and in terms of God›s action are not rival answers to a problem; rather they are complementary explanations of an event, from different points of view, where one cannot give a complete explanation in terms of one of the two views. (30) An architect draws various maps for a building, where one of them shows the spaces of the floors, another one shows a view of the building from outside, etc.

Science As a religious activity

Another possibility is that science and religion are seen under one umbrella (worldview). Here, seeking knowledge is a kind of religious worship, in which experiment, theoretical work, intuition, and some religion – based metaphysical principles are used at the same time. For this view one can present the following arguments.

(a) This kind of view was prevalent during the Islamic civilization era and it was followed during the middle ages in Europe. To support this view, we appeal to a tradition from **Imam Ali** (AS):

> *"No worship is like thinking about God›s creation.» (31)*

Some eminent Muslim scientists of that era explicitly mentioned this point. In the words of **al-Biruni**:

> *«Sight connects what we see to the signs of Divine wisdom in creation and deduces the existence of the Creator:» (32)*

In his book «The social structure of Islam», Levy points out that the motivation of those Muslims that did research in science, was to see the glory of God›s handiwork in the wonders of creation. (33)

In the early days of modern science, the same view was prevalent. In the words of **Robert Boyle**:

> *«[Science seeks] the disclosure of the admirable workmanship which God displayed in the universe." (34)*

The British Royal society, in its 1662 declaration, mentioned that members should direct their attention on showing the glory of God and the benefit of the human race. (35)

Charles Townes sees scientific research as a religious experience:

> *«I do not myself separate science and religion, but regard our exploration of the universe as part of my religious experience.» (36)*

and so is **Arthur Schawlow**:

> *«But the context of religion is a great background for doing science. In the words of Psalm 19, ‹The heavens declare the Glory of God and the firmament showeth his handiwork.› Thus, scientific research is a worshipful act, in that it reveals more of the wonders of God›s creation.» (37)*

(b) In doing scientific work, one uses some supra -scientific (primarily metaphysical) assumptions, like faith in the existence of an external world, reliance on the report of colleagues, etc. All of these assumptions are

supra-scientific, and the belief in them needs a reference frame. In the words of **Mary Midgley** (a contemporary British philosopher):

> *"Science cannot stand alone. We cannot believe its propositions without first believing things, such as the existence of the external world, the reliability of our sciences, memory and informants, and the validity of logic. If we do believe in these things, we already have a world far wider than that of science." (38)*

and so, says **George Ellis** (an eminent contemporary cosmologist):

> *«Essentially, investigations of the foundations of science are beyond the scope of science itself.»(39)*

In fact, to justify the use of supra-scientific assumptions and also the ability of humans to explain natural phenomena, and explanation for using moral values in scientific work, we need a comprehensive framework that can answer all questions of human concern. In my view, a monotheistic worldview can provide such a comprehensive framework.

Sources

(1) Crick, Francis, Of Molecules and Men (Seattle: University of Washington Press, 1966), p. 10.

(2) Barbour, Ian, Religion and Science (San Francisco: Harper, 1997), p.80.

(3) Ibid., p. 85.

(4) Ibid., pp. 86-7

(5) Ibid., p. 86.

(6) Ibid., p. 87.

(7) Davies, Paul, The Mind of God (New York: Simon & Schuster, 1992), p.15.

(8) Cosmos, Bios, Theos: Scientists Reflect on Science, God, and the Origins of the Universe, Life, and Homo Sapiens, edited by Henry Margenau and Roy Abraham (Open Court Pub. Co.,1992), p.171

(9) Barbour, Ian, Religion and Science, p. 211.

(10) Ibid., pp. 91

(11) Barbour, Ian, Religion in an Age of Science (SCM Press, 1990), p. 20.

(12) Cosmos, Bios, Theos, p. 106.

(13) Ibid.

(14) Ibid., p. 105.

(15) Planck, Max, where is Science Going? translated by James Vincent Murphy (New York; W.W. Norton & Co. Inc. ,1932), p. 214.

(16) Russell, Robert J., et. al., Physics, Philosophy and Theology Vatican City State: Vatican Observatory, 1988), pp. M11-12.

(17) Barbour, Ian, Religion in an Age of Science, p. 19.

(18) Newton, Isaac, Optics (New York: Dover, 1952), p. 344.

(19) Barbour, Ian, Religion and Science, pp. 51 & 99.

(20) Barbour, Ian, Religion in an Age of Science, p. 25.

(21) Barbour, Ian, Religion and Science, p.10

(22) Barbour, Ian, Religion in an Age of Science, p.26.

(23) Ibid., p.27.

(24) Ibid.

(25) Ibid., pp. 29-30.

(26) Ibid., p. 30.

(27) Cosmos, Bios, Theos, pp. 122-123.

(28) Townes, Charles H., « The convergence of Science and Religion», Think, March-April 1966, Vol. 32, No. 2, P. 7.

(29) Ibid. PP. 6-7.

(30) MacKay, D. M., in Berry, R. J. (ed.) Real Science, Real Faith (Eastbourne: Monarch ,1991), p. 205.

(31) Rayshahri , Muhammad, Asraar al-Hikmah, Vol. 3 (Tehran: ShikaZ al-Nashr al-Ilmi wa al- Thqafi , 1991), p. 77.

(32) abu Rayhan al-Biruni, Kitab al-Jamahir fi Marifah al-Jawahir (Hyderabad, India: Matba›ah Jam›iyyah Daerat al- Ma›arif al-Othmaniyyah,1355 H.) p.5.

(33) Levy, R., The Social Structure of Islam (Cambridge: Cambridge University Press, 1957) p. 460.

(34) Barbour, Ian, Religion and Science, p.19.

(35) Ibid.

(36) Singh, T.D. and Gomatam, R., eds., Synthesis of Science and Religion (Bombay: The Bhakativedanta Institute, 1987), p.141.

(37) Cosmos, Bios, Theos, p. 106.

(38) Mary Midgley, Science as Salvation (London: Routledge ,19920, p.108.

(39) Ellis, George F., Before the Beginning (Marion Boyars Publishers Ltd., 2000), p. 101

| CHAPTER FOUR |

LIMITATIONS OF EMPIRICAL KNOWLEDGE

Introduction

Modern science started with the works of Copernic, Kepler, Galileo, Newton, Boyle, etc. But during the 17th, 18th, and nineteenth centuries some philosophical schools emerged that had emphasis on the findings of senses. These schools had no room for metaphysical speculations, and became dominant during the nineteenth century. Furthermore, they had emphasis on the following points:

(1) Observations are the only sources of our reliable knowledge.

(2) In order to make sense of a concept, we have to define some processes for its measurement.

(3) Anything which cannot be verified empirically has to be eliminated from physics.

(4) Theories are direct results of experiments.

(5) Observation precedes a theory and we don't see anything but hare facts.

This kind of mentality was dominant until the middle of the twentieth century.

In the refutation of (1), it is said:

• We have concepts which are not drawn directly from facts (like the concept of non-existence).

• Taking observation as a criterion is not an empirical fact, but is a metaphysical principle.

• Our knowledge usually goes beyond mere observations. For example, the knowledge that stars are large is not a result of our sensations.

In refuting the claim (2), it is said:

• We always define a concept in terms of some other concepts, and there are always some undefined concepts.

• A measurement tool used by an experimenter, always includes some instructions about how to use the tool.

In the refutation of (3), it is said:

If physicists had followed this instruction, they would have not reached some important results. Thus, even those who were after this claim, they neglected them afterwards.

In refuting (4), it is said:

• The replacement of theories by other ones is a strong argument against this claim.

• A formula which is confirmed by experiment can be derived from different theories.

• Some fundamental concepts in physics were first introduced by some mathematicians who had no physical concerns.

Finally, against the claim (5), it is said:

• We never encounter something with empty minds. Rather, we always use our preconceptions when we encounter something.

• An experimenter's presuppositions always play an important role in his detections. For example, experiments had shown some paths belonging to a particle with a

charge opposite to that of election. But, it was only after the introduction of positron (anti-electron) by Dirac that physicists paid attention to those paths.

The unavoidability of Metaphysics in Empirical Science

We claim that scientists have not been able to dispense with metaphysical principles, and they have always used, intentionally or unintentionally, some supra-scientific assumptions. There are several reasons for this:

(1) Science, per se, needs a metaphysical justification for its success. Many scientists take science as mirroring reality, i.e. what is shown by science is the whole reality. But, this is an assumption which needs justification. Science may lead to some facts, but it does not necessarily show the whole reality. Relying on science needs justification. In the words of **Roger Trigg** (an eminent contemporary British philosopher):

> *«For science to explain everything, we need a reason for trusting science.» (1)*

Mathematical propositions are examples of analytic sentences, and have no empirical content. But the theories of physics have empirical content and are examples of synthetic sentences. Now, the question arises about how we can make a bridge between these two?

A mathematical theorem, by itself, says nothing about the world. In the words of **Roger Trigg**:

> *«The applicability of mathematics to the physical world itself illustrates how an underlying*

rationale appears to be built in the fabric of the world. It should, after all, seem extraordinary that symbols produced by the human mind could serve to unlock some of the deepest mysteries of physical nature and grant us a tremendous power over it.» (2)

On the other hand, Gödel's incompleteness theorem, says that one cannot show the consistency of a mathematical system internally. Rather, it can be shown by going beyond it. This can be generalized to physics, as physics uses mathematics both theoretically and empirically. (3)

(2) The Role of Metaphysical Principles in Science

Due to the ruling of positivism, which considered only sense-based data valuable, during nineteenth century, metaphysical principles were neglected formally by most of the scientists. But it soon became apparent that physicists always use, intentionally or unintentionally, some supra-scientific principles. For example, Bohr appealed to the complementarity principle. But this principle has some metaphysical basis, like the principle which says classical concepts are the only concepts which are relevant.

Similarly, Heisenberg introduced the uncertainty principle, which denied causality at the atomic level. But, as some philosophers mentioned, here he had a jump from an epistemological position, of not finding causes at the atomic level to an ontological position that there are no causes at the atomic level. Logical Positivists, too, who considered metaphysical propositions as meaningless, had a specific metaphysics. They denied a metaphysics

which deals with supra-empirical realities.

Furthermore, it became clear that every scientist's work is based on some general principles, which work for him as guiding principles. Here, we mention several examples:

Heisenberg believed in the mathematical simplicity of the laws of nature:

> *«Mathematical simplicity ranks as the highest heuristic principle in exploring the natural laws in any field opened up as a result of new experiments.» (4)*

But, this principle is not derivable from experience; otherwise, no scientists would deny it.

On the other hand, according to **Freeman Dyson** (an eminent scientist of our time):

> *«What philosophical lessons arise from the recent discoveries in physics? The main lesson to be learned is that nature is complicated. "(5).*

The Russian chemist, **Prigogine**, had the same idea:

> *«The idea of simplicity of the microscopic world is probably an idea which is gone and will never come back." (6)*

(3) The existence of questions in science which science cannot answer.

Science is powerful, but it has limitations, as it cannot deal with some other areas of human concern, such as beauty or human freedom. Furthermore, there are some fundamental questions in physics, which physics, by itself, cannot answer:

(a) What is physical reality? Is it material or immaterial or both?

(b) How was the world created?

(c) What is the final state of the world?

(d) What is the purpose of the creation of this world?

(e) Where do the laws of physics come from and why do they have the present form.

Physics alone cannot answer all of these questions.

Particle physics deals with the question for (a). Cosmology has provided some responses for (b) and (c), but it has little to offer for other questions.

Thus, in recent decades, some eminent scholars have suggested that we should choose a more comprehensive framework which can deal with all aspects of human concern, and not only the part that our empirical knowledge can deal with. For example, science cannot neglect ethical values, as they have important effects on human life.

Peter Medawar, a Nobel Prize Winner in Medicine, emphasizes the importance of fundamental human concerns and the fact that science, per se, cannot explain them:

> *«That there is a limit upon science is made very clear by the existence of questions that science cannot answer and that no conceivable advance of science could empower it to answer. These are questions that children ask- the «ultimate questions» of Karl Popper. I have in mind such questions as:*
>
> *- How did everything begin?"*

- What are we all here for?

- What is the point of living? « (7)

And says:

> *«It is not to science, therefore, but to metaphysics, imaginative literature or religion that we must turn for answers for questions having to do with first and last things.» (8)*

But **Arthur Schawlow**, a Nobel Laureate in Physics, believes that the only possible responses to these questions are religious ones:

> *«It seems to me that when confronted with marvels of life and the universe, one must ask why and not just how? The only possible answers are religious... I find the need for God in the universe and in my own life.» (9)*

Now, since science cannot provide responses to human concerns, and cannot give a complete picture of our world, and leaves some relevant questions in science without any response, we have to look for a comprehensive framework. In the words of **George Ellis** (an eminent cosmologist of our time):

> *«We should use broad criteria that take into account the whole range of human experience and not just that part which can be scientifically described.»(10)*

It has been due to these considerations that some eminent scholars have explicitly said that in science we cannot escape from philosophy (metaphysics). In the words of

Werner Heisenberg:

> *«I believe that certain erroneous developments in particle theory – and I am afraid that such developments do exist – are caused by a misconception by some physicists that it is possible to avoid philosophical arguments altogether. Starting with poor philosophy, they pose the wrong questions. It is only a slight exaggeration to say that good physics has at times been spoiled by poor philosophy.»(11)*

Herman Weyl (an eminent mathematician of the 2oth century) had the same idea:

> *«In spite of the fact that the views of philosophy sway from one system to another; we cannot dispense with it unless we are to convert knowledge into a meaningless chaos.» (12)*

And so is **Stanley Jaki** (an eminent clergy-physicist):

> *«Belief in metaphysical principles is still indispensable in scientific work whether some physicists like it or not, or whether they admit it or not, or whether they are fond of the word metaphysical or not.» (13)*

(4) How does metaphysics affect science?

(a) It is the philosophical attitude of a scientist which determines his aims of scientific research. An empiricist is confined only to empirical data and to present phenomenological models to explain those data. But, a scientist with a philosophical outlook is not confined to a phenomenological description, but is after understanding

the natural world. As **Heisenberg** put it:

> *«At this point you see the enormous importance of the philosophical background in research. It does not determine the answers when the questions are given, but it does influence the questions. The results of scientific work can be quite different if you either try to find out the plan according to which nature is constructed, or you just want to observe, to describe and to predict the phenomena. The final understanding can depend on this decision.» (14)*

Heisenberg considered different encounters of his Chinese and Japanese students with his European students with quantum theory to be due to their philosophical attitudes. (15)

(b) In fact, we can say that metaphysics provides a framework for science. **Schrodinger** believed that every scholar's work is based on some general principles, though he may not be consciously aware of it:

> *«Natural sciences do not rely exclusively on experiments, but also on a certain fundamental hypothesis; a hypothesis which is very, very, obvious, and which is accepted by everyone. « (16)*

Furthermore, he believed that metaphysics provides a framework for science:

> *«Metaphysics does not form part of the house of knowledge but is the scaffolding without which further construction is impossible.» (17)*

We can say that metaphysical principles work as guiding

principles for a scientist, and play an important role in one's science. More generally, the culture of a scientist is effective in his choices. In the words of **Ander Linde**:

> *«When scientists start their work, they are subconsciously influenced by their cultural traditions.» (18)*

Here we mention several examples:

• Galileo Believed that our natural world can be described by mathematics.

• For Einstein and Dirac, mathematical beauty was a criterion for accepting a theory.

• For Schrodinger, the understanding of natural processes was a fundamental principle.

• In our time, the unity of fundamental forces of nature is a principle. We see the traces of this in Einstein's works as well as in Witten's. In his lecture, at Trieste in 1989, Witten mentioned that the aim of a physicist is to start with unifying ideas. In the last couple of decades, the unity of fundamental forces of nature has been a hot subject among theoretical physicists.

(c) Ignoring the ontological or epistemological considerations, can lead to wrong conclusions. For example, when the mathematics of two theories are identical, are they physically identical too?

Sometimes, physicist make a theory on the basis of an idea, but that theory is not confirmed by experiments. Does this mean that the idea under consideration is wrong? The answer is: No. Because the rejection of a manifestation of an idea, does not rule out that idea.

(d) As we mentioned earlier, there are some questions in science which are basically metaphysical and science cannot provide answers for them: For example

- Why the laws of nature are mathematical?
- Why mathematics, which seems a product of human mind, is so successful in the description of nature?

(e) In biology, there are some problems which have been very controversial. For example, the nature of human consciousness has been among the most controversial problems. Some physicists like Planck, Bohr, Schrodinger, Gödel, and Witten, and some biologists like Eccles do not consider human consciousness explainable in terms of physics.

On the other hand, there are some scientists who think that science can explain everything. This view assumes that science can have access to all reality, and there is no other way. But, this assumption is not provable, as we must first explain why science is reliable. Furthermore, Gödel's theorem indicates that to explain a system based on mathematics, we must go beyond mathematics. Thus, to explain science we have to go beyond science. i. e. to metaphysis.

The Revival of Philosophy in Recent Decades

As we said, philosophy was ignored in scientific media for a long time. In fact, scientism worked as a religion for scientists, a trend which is still prevalent in many places. But, during the last few decades, many scientists have started to consider metaphysical ideas, as they see that science per se is not capable of answering all questions

of human concern, some of which have a metaphysical nature.

Here we want to mention some signs which indicate the revival of metaphysical concern among some eminent scientists, like von Weizsäcker , Margenau , and George Ellis. On the other hand, some philosophers like Redhead, David Albert and Maudlin have done some good works on the philosophical aspect of some fundamental problems in physics. Furthermore, some physicists have got a doctoral degree in philosophy, in addition to their doctoral degree in physics.

Thus, it has become clear that positivists› attempt to ignore philosophy has become unsuccessful, and the anti-metaphysical current of the last two centuries has been a temporary event. In the words **of Arthur Burtt** (American Philosopher):

> *«To begin with, there is no escape from metaphysics, that is, from the final implications of any proposition or set of propositions. The only way to avoid becoming a metaphysician is to say nothing.» (19)*

In fact, the work of every scientist involves some philosophical aspects, although he may not be aware of it. The neglect of philosophy does not solve problems; rather, it replaces an explicit philosophy with an uncontrolled raw philosophy. In the words of **Max Jammer**:

> *«Physicists traditionally refrain from declaring themselves as subscribingto a particular school of philosophical thought, even if they are*

consciousof belonging to it. The influence of a particular philosophical climateon their scientific work, although often of decisive importance forthe formation of new conceptions, is generally ignored. It is certainly truethat philosophical considerations in their effect upon the physicist›s mindact more like an undercurrent beneath the surface than like a patent well defined guiding line.» (20)

The important point is to understand the real significance of philosophy, and note that science and philosophy are complementary and that any apparent discrepancy between them is due to errors in one of them or in both. As **John Ziman** (a British physicist) put it:

"The divorce of science from philosophy impoverishes both disciplines." (21)

The role of philosophy in the choice of theories and their interpretation

When we are dealing with fundamental theories in physics or in biology or other sciences, metaphysical presuppositions play an important role in the choice of theories or their interpretations. Here we mention several examples.

(1) The unification of the forces of nature is one of the important goals of contemporary physics. Three physicists, Muhammad Abdus Salam, Sheldon Glashow and Steven Weinberg, shared Nobel prize in physics for the unification of two fundamental forces of nature. But their motif for this action was different. Glashow (22) and Weinberg (23) went after this unification, because it

would be useful in practice. But Abdus Salam considered it as an obvious principle, and he was surprised that some physicists had not followed it (24).

(2) In recent decades some physicists have noticed that the emergence of life in the universe depends on a fine tuning of the strength of the four fundamental forces of nature. For example, if the strength of the gravitational force was a bit stronger than what it is now, the expansion of the universe would have stopped and its compression would have started. Then, there would be no chance for the formation of galaxies. On the other hand, if the strength of the gravitational force was a bit weaker than its present value, the world would have expanded very fast and there would have not been any chance for the formation of stars. In both of these cases. the condition for the formation of Carbon atoms, which are necessary for the material aspects of life, would not be present. Thus, it seems that the laws of physics are arranged in such a way that the condition for the emergence of life would be satisfied. This fine tuning of fundamental forces of nature is called anthropic principle. For the explanation of this fine tuning several theories are presented, the most prevalent of them are the following.

• There are infinitely many worlds. Thus, it is not surprising that one of them has appropriate conditions for life.

• There is only one world and it has had a designer.

The atheist physicists have chosen the first alternative and the theist scientists believe in a Designer. For example, **Peter Atkins**, an atheist chemist, says:

«It is possible that this is not the only universe, it is possible that the universes are falling into existence while we are speaking at the moment. Somewhere there are trillions and trillions of universes. And it is possible that all these universes have a different mix of fundamental constants...Some will give rise to matter, but not life:..You could imagine a whole crowd of billions and billions of universes, and it just happens that one of those (may be more than one, but at least one of those) happened to tumble into existence with a particular mix of fundamental constants that allowed life to develop. «(25)

On the other hand, **Roger Trigg**, a theist philosopher, says:

«Some people talk about an immense number of universes and it just happens that we are in the universe that produced us...But, I think if the answer to a question is an infinite number of universes, one is in great difficulties I think it is much simpler to believe in God who created the one universe, rather than saying there are an enormous number and we just happen to be in the one that has come up in this way.» (26)

A problem with the multiverse idea is that it is not empirically verifiable, as those universes are beyond our access and are not verifiable empirically. Thus, from scientific point of view, the idea is not attractive. In the words of **Paul Davies**:

«Not everybody is happy with the many-universes

theory. To postulate an infinity of unseen and unseeable universes just to explain the one we do see seems like a case of excess baggage carried to the extreme. It is simpler to postulate one unseen God. This is the conclusion also reached by Swinburne...Scientifically the many-universes theory is unsatisfactory because it could never be falsified: what discoveries would lead a many-worlder to hang her/his mind? What can you say to convince somebody who denies the existence of these other worlds?» (27).

Furthermore, the Omnipotent God of the monotheistic religions can create many worlds. Thus, some theist Western philosophers, believe in the multiverse idea, as they consider God's grace to be infinite. As **Robin Collins**, an American philosopher said:

«I will argue not only that theism is compatible with the universe-generator version of the multiverse hypothesis, but also that theists might even have reasons for preferring a multiverse over a single universe. Since within the world's theistic traditions, God is considered infinite and infinitely creative, it makes sense that creation would reflect these attributes, and hence that physical reality might be much larger than one universe. Further, it makes sense that an infinitely creative God might create these many universes via some sort of universe-generator, since arguably this would be somewhat more elegant and ingenious than just creating them ex nihilo.» (28)

(3) According to the Darwinian theory of evolution, the emergence life is the result of some physical processes, and it look place through a mechanism called natural selection. This theory has had both atheistic and theistic interpretations. **Richard Dawkins**, an atheist zoologist, says:

> *«The universe we observe has precisely the properties we should expect if there is, at bottom, no design, no purpose, no evil and no good, nothing but blind, pitiless indifference. « (29)*

But, biological findings cannot rule out the role of God, as one cannot get general conclusions from some specific data. In fact, the theory of evolution can have theistic interpretation too. For example, Francis Collins (physician-geneticist and the ex-director of the National Human Genome Research Institute in Washington D.C.) has a theistic view about the theory of evolution. In his view, God uses the process of evolution to carry out His creative activity. (30)

In short, living creatures can be the result of natural selection, but this process could be a result of God's design.

(4) One of the controversial problems of our time is whether there is a purpose behind the creation of our universe. The pioneers of modern science were believers in God's design of the universe. But, they confined themselves to description of phenomena and neglected teleological considerations. But, due to the prevalence of positivism, teleology was considered as a way to God. So, atheist scientists have denied the presence of purpose in the creation of our universe. For example, **Weinberg** (a

well-known Nobel Laureate in physics) says:

> *"The present universe had evolved from an unspeakably unfamiliar early condition, and faces a future extinction of endless cold or intolerable heat. The more the universe seems comprehensible, the more it also seems pointless." (31)*

In response to Weinberg, **Paul Davies** (another eminent contemporary physicists) mentions two important points:

> *"If [the universe] isn't about anything, there would be no good reason to embark on the scientific quest in the first place, because we would have no rational basis for believing that we could thereby uncover additional coherent and meaningful facts about the world. So, we might justifiably invert Weinberg's dictum and say that the more the universe seems pointless, the more it also seems incomprehensible." (32)*

But, Weinberg upon encountering the criticism of his view changed his position and mentioned that that with the methods of science one cannot detect a purpose for the universe. (33)

The aforementioned examples show cleanly the role of metaphysical presuppositions in the choice of theories and their interpretations.

In fact, when we are dealing with fundamental problems in science, decision making on the basis of science per se is difficult. Here the metaphysical commitments of scientists has a decisive effect.

But, metaphysical presuppositions can be taken from

various sources, including religion. For example, **Einstein** attributed the source of the belief in the comprehensibility of our universe to religions:

> *"To this [sphere of religion] there also belongs the faith in the possibility that the regularities valid for the world of existence are rational, that is comprehensible to reason. I cannot conceive of a genuine scientist without that profound faith. The situation may be expressed by an image. Science without religion is lame, religion without science is blind.» (34)*

Andre Linde, an eminent cosmologist of our time, believes that the search for a theory of everything is rooted in monotheistic religions:

> *«The whole of modern cosmology has been deeply influenced by the western tradition of monotheism... the idea that it is possible to understand the universe through one ultimate 'Theory of Everything' is an outgrowth of belief in one God.» (35)*

Summary

We pointed out the scientific work can be done within different metaphysical backgrounds. But, although these alternative frameworks
have some common elements, in the long run they lead to different conclusions. Now, I want to say, in the company of Roger Trigg, (36) that scientific work can get its justification in a theistic ground much easier than in other ways. Trigg's argument goes as follows.

(a) For scientific work we must assume that we are dealing with a lawful world. This cannot be derived from the science itself, but we need to assume that unknown is similar to the known, and that the findings of science are always and everywhere valid. Without these assumptions, we cannot generalize our scientific findings.

(b) The applicability of mathematics for the description of our world seems miraculous. Why should the signs which are the creations of our mind be suitable for disclosing the secrets of our world and can give us control over other parts of the universe.

It seems that there has been a rationality at work and that there has been a turning between our mind and the rest of the world, so that our universe has become understandable for our minds. Without this turning, there would not be any science.

(c) Now, the question arises as to why the reality has this structure and why our mind is capable of understanding it? A simple answer is that this is the way it is, i. e. we don't seek any explanation. But a more satisfying answer is that an Omniscient Omnipotent God has designed this world. This takes us from a metaphysical realism to theism.

(d) Considering the aforementioned points, we can say that science get its legitimacy in a theistic framework, as scientific work needs some assumptions that can only be derived from theism. The early history of modern science is a good witness to this paint.

Sources

(1) Roger Trigg, Rationality and Science: Dan Science Explain Everything? (Oxford: Blackwell Publishers,1993), p.9.

(2) Roger Trigg, Rationality and Religion (Oxford: Blackwell Publishers,1998) ,p.81.

(3) Barrow, J. D., Impossibility: The Limits of Science and the Science of Limits (Oxford: Oxford University Press, 1998), p. 209.

(4) Heisenberg, Werner, Philosophical problems of quantum physics (Woodbridge, Conn.: Ox Bow Press, 1979), pp. 58-59.

(5) Dyson, Freeman,1988, Infinite in all Directions (Harper Perennial, 2004),P. 7.

(6) A Question of Physics, ed. By P. Buckley et. al. (Routledge & Kegan ,1979), p. 77.

(7) Medawar,Peter, 1984, The Limits of Science (Oxford, Oxford University Press, 1984) ,p.66.

(8) Ibid., p. 60.

(9) Cosmos, Bios, Theos, ed. by Henry Margenau and Abraham Varghese (La Salle, Ill.: Open Court, 1993, p. 105.

10. Ellis, George, F., Before the Beginning (New York: Boyars/Bowerdean , 1993), p.86.

(11) Heisenberg, Werner, Physics Today, March 1976, Vol. 29(3), 32.

(12) Weyl, Hermann, Space-Time - Matter, trans. By H. L. Brose (London: Methuen, 1922), P. 10.

(13) Jaki, Stanley, The Relevance of Physics (The Scottish Academic Press, 1992) p. 352.

(14) Heisenberg, W., Werner Heisenberg GESAMMELTE WERKE Collected Works, Series C/Part III (Berlin: Springer-Verlag,1985), 499.

(15) Ibid., p. 477.

(16) Bitol, Michel, Schrodinger›s Philosophy of Quantum Mechanics (Dordrecht: Kluwer Publication,1996), p.252.

(17) Schrodinger, E., My View of the World (Cambridge: Cambridge University Press,1964), pp. 4-5.

(18) New Scientist, Vol. 4, Oct.1997, p.31.

(19) Burtt, E. A., The Metaphysical Foundations of Modern Science (Dover Publications, 2003), p. 227.

(20) Jammer, max, The Conceptual Development of Quantum Mechanics (New York: McGraw-Hill Book Co., 1966) P. 166.

(21) Maxwell, Nicholas, From Knowledge to Wisdom (Oxford: Basil Blackwell, 1984), p. 27.

(22)Crease,R.P.,et.al.,TheSecondCreation(Collierbooks,1981,PP.417-418.

(23) Superstrings: A Theory of Everything, ed. By Davies, Paul, et. al. (Cambridge University Press, 1988), P. 203.

(24) A Passion for Science, ed. By Wolpert, L. et. al. (Oxford University Press, 1988), p.18.

(25)Stannard,Russell,ScienceandWonders(Faber&Faber,1998),pp.24-25.

(26). Ibid., p. 30.

(27) Davies, Paul, The Mind of God (Simon & Schuster,1993), p. 190.

(28) Carr, Bernard, Universe or Multiverse (Cambridge University Press, 2009), p. 460.

(29). Dawkins, Richard, River Out of Eden: A Darwinian View of Life (New York: Basic Books, 1995), p. 133.

(30) Collins, Francis, The Language of God (New York: Free Press, 2006), pp. 163-164.

(31) Weinberg, Steven, The First Three Minutes (Bantam ,1980), p. 154.

(32). Davies, Paul, The Goldilocks Enigma: Why Is the Universe Just Right for Life? (Great Britain: The Penguin Press, 2006), p.16.25.

(33) http://www.pbs.org/faith and reason/transcript/Weia-frome.html

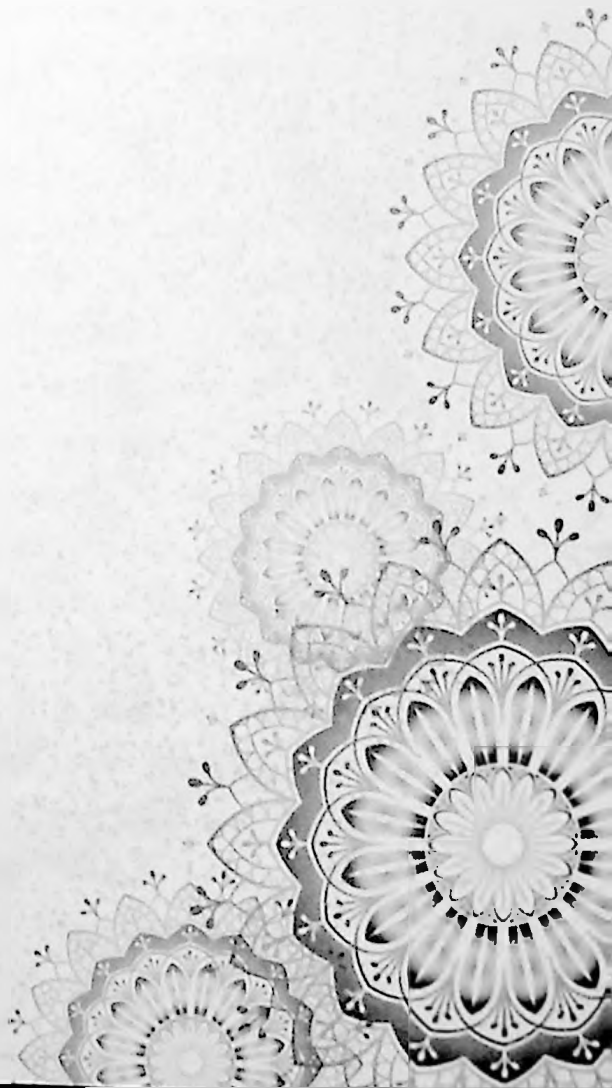
(34) Schilpp , A. P. , Albert Einstein: Philosopher-Scientist (La Salle, Ill.: Open Court,1970),p. 285.

(35). The Christian Science Monitor, July 9, 1998, p. B4.

(36) Trigg, Roger, Rationality and Religion (Blackwell Publishers,1998), pp. 80-83.

| CHAPTER FIVE |

DO SCIENCE AND RELIGION BELONG TO TWO DIFFERENT CULTURES?



Introduction

It is a commonly held view in our time that science and religion belong to two different cultures, i.e. they have different underlying cultures. Some scholars believe that they belong to two independent cultures, some admit some overlapping elements, and some consider them to have complementary cultures. In this paper I want to argue that they do not belong to two different cultures. Rather, they may have a common underlying worldview. Scientific knowledge involves a systematic search for understanding the structure and functions of our natural world. Religion is a response to the transcendent which transforms our lives and gives it a meaning. Both science and religion deal with the same world. Science seeks to discover the order present in nature and describes this order in the form of laws. Religion seeks to find the meaning and telos in the world and our position in it. Furthermore, both science and religion have ontological and epistemological claims about the physical world, and this does not cause any problem, because we can have different levels of understanding.

Many contemporary scholars consider science as

objective, universal and rooted in observational evidence and they see religion as subjective, emotional and based on faith and authority. These scholars consider scientific knowledge as the only kind of knowledge which can be reliable, and they consider science as the ultimate source of explanation of everything.

Here we want to argue that:

I. The underlying cultures of science and religion are not quite distinct.

In fact, scientific knowledge and religious knowledge have some common features:

(a) Both science and religion take certain assertions about the physical world, such as the orderliness or the comprehensibility of the natural world, as a matter of faith. As **Max Planck** put it:

> *"Anybody who has been seriously engaged in scientific work of any kind realizes that over the entrance of the gates of the temple of science are written the words: Ye must have faith. It is a quality which the scientist cannot dispense with." (1)*

Einstein concurs:

> *"The basis of all scientific work is the conviction that the world is an ordered and comprehensive entity, which is a religious sentiment." (2)*

In fact, science has its own faith-based convictions and without it scientific endeavour would not make sense. In the elaborate words of **Paul Davies**:

"The problem with this neat separation into non-overlapping magisteria, as Stephen Gould described science and religion, is that science has its own faith-based system. All science proceeds on the assumption that nature is ordered in a rational and intelligible way: You couldn't be a scientist if you thought the universe was a meaningless jumble of odds and ends haphazardly juxtaposed (3)."

The faith in the reliability of science, however, can be justified at a meta- scientific level. **Roger Trigg** argues that (4) science can get its legitimacy only in a theistic context. His argument goes as follows;

(i) For doing scientific work, we must accept, as a matter of faith, that the world with which science deals is orderly and lawful.

(ii) Why should mathematics, apparently a product of human mind, be successful in unraveling the mysteries of our universe.

(iii) The success of science indicates that our universe is orderly and that it is the tuning between human mind and the rest of the cosmos which makes the universe understandable to human beings.

To explain these facts, one may say that this is just the way things are, but a more acceptable answer is that this is the state of affairs because God made it that way.

(b) While religion is rooted in revelation, some of the scientific discoveries are made through intuition. As **Charles Townes** put it:

"Most of the important scientific discoveries come about very differently and are much more closely akin to revelation. The term itself is generally not used for scientific discovery, since we are in the habit of reserving revelation for the religious realm. In scientific circles one speaks of intuition, accidental disco-very, or says simply that 'he had a wonderful idea'." (5)

(c) Contrary to what is commonly claimed, physicists cannot claim finality for physical theories, as these are heavily based on mathematics. But, all mathematical systems are based on some underlying axioms and according to Gödel's theorem one can›t prove the consistency of a set of axioms, unless one appeals to a larger system. Thus, to explain science one has to appeal to meta-science (metaphysics).

(d) In both science and religion, one has to deal with ethical issues. All religions have an underlying ethical base. On the other hand, it is a commonly held view among scientists that facts and values are separate. But scientists cannot ignore ethical values, as the whole scientific enterprise involves value-judgments, i.e. there is no possibility of doing science in a moral vacuum. In fact, all scientists usually observe certain values in their scientific work, e.g. being unbiased, truthful, etc. So, even **Popper** who is advocating the separation of facts from values admits that:

"The fact that science cannot make any pronouncement about ethical principles has

been misinterpreted as indicating that there are no such principles, while in fact the search for truth presupposes ethics." (6)

Secondly, the selection between theories is always made on the basis of some value-judgments such as consistency of parts, unification power, generality, etc. But ethical values cannot be derived from science per se. Thus, scientific culture is not purely scientific. Religion can supply a source for ethical values.

The divorce of science from ethics is the main cause of the most destructive effects brought about by the misuse of science. This, in turn, is the result of the materialistic outlook dominant in scientific circles of our time, an outlook which has neglected the spiritual dimension of human beings and the ethical responsibility of scientists. The remedy is the replacement of the present empiristic philosophy of science by a new philosophy of science in which all concerns of humanity is taken care of. **Dr. Richard Thompson**, of La Jolla Research Institute in California, has elaborated on this subject:

"The understanding of nature as a machine has resulted in much technological progress, but now we find people throughout the world abandoning supremacy – a struggle that culminates in the construction of more and more deadly machines of mass destruction. It can be argued that this trend of modern civilization has been strongly encouraged by scientific theories that appear to contradict any philosophy of life other than materialism. It may be very difficult to

change this dangerous trend. But an essential ingredient for such a change could be the wide dissemination of a valid approach to scientific knowledge that allows for tangible spiritual dimension to human life and is compatible with the ancient understanding that mankind is dependent on a transcendental supreme Being. Such an approach opens up the possibility of directly human energy towards higher spiritual goals and of providing a solid ethical basis for the conduct of our material affair." (7)

II. Scientific knowledge cannot deal with all aspects of human life:

(a) Certain questions arise in science for which science by itself cannot supply any response, e.g.:

- Where do the general laws of science come from?
- Why do we understand these laws?

Science per se cannot provide a response to these so-called "limit questions". In the words of **George Ellis**:

"The point is that physics can comment on physical laws actually in operation., but not on where they come from or why they exist? This is Obvious if you think about the scientific method and the restrictions on verifiability considered previously... Such metaphysical issues have to be decided on the basis of criteria that lie outside of physics itself. "(8)

To have a response to these kinds of questions a more general framework is need. Again, religion can provide a response for these kinds of questions, i.e. it enriches the scientific culture.

(b) Because of the limitation of its scope, modern science cannot answer the so-called 'ultimate questions' of human concern-questions like 'What are we doing here? 'What is the purpose of life?'. It is also silent about the meaning and purpose of human life. In the revealing words of **Eugen Wigner**:

> *"I don›t think physics deals with everything. Whether I am happy or unhappy, whether I am afraid or fearless, whether I am noble or I am mean, how does this get represented in science? Even if there are people who would say there is a chemical imbalance, I would like to think that there is something else." (9)*

And in the elaborate words of **Freeman Dyson**:

> *"The greatest unsolved mysteries are the mysteries of our existence as conscious beings in a small corner of a vast universe. Why are we here? Does the universe have a purpose? Whence comes our knowledge of good and evil? These mysteries and a hundred others like them, are beyond the reach of science. They lie on the other side of the border, within the jurisdiction of religion. "(10)*

Some scientists pretend not to be concerned about these types of questions. But, if a scientist neglects these "ultimate questions" at one time or another, he cannot dispense with them all the time. The experience of **Max Born** is revealing:

> *"Long years of neglect have not deleted the deep impression received in my youth by the age-old*

attempts to answer the most urgent questions of the human mind: The questions about the ultimate meaning of existence, about the universe at large and our part in it, about life and death, truth, and error, goodness and vice, God and eternity. But just as deep as this impression of the importance of the problems, is the memory of the futility of the endeavour: There seemed to be no steady progress as we find in the special sciences, and like so many others, I turned my back to philosophy and found satisfaction in a restricted field where problems can actually be solved. Yet getting old, I feel, again like many others, whose productive powers are declining, the desire to summarize the results of the scientific research in which, during several decades, I have taken a small part, and that leads unavoidably back to those eternal questions which go under the title of metaphysics." (11)

There are also some scientists, like Dawkins, who claim that science will finally answer these questions. But considering the nature and scope of empirical science, I think this is out of modesty. In the elegant words of **Roger Penrose**:

"Three is a certain physicist's arrogance about it that suggests that knowing all the physical laws would tell us everything about the world, at least in principle. Does a physical theory of 'everything' include a theory of consciousness? Does it include a theory of morality? or of human behavior, or of aesthetics? Even if our idea of science could be expanded to incorporate these things, would we still think of it as 'physics', or

would it be reducible to physics?" (12)

III. The Role of Metaphysics in Science and Religion

Both science and religion are based on some metaphysical principles. The issue is clear in the case of religion. But, the present scientific communities, which are heavily under the influence of empirisistic philosophies, deny any relevance of metaphysics. The empiricistic philosophy, which had started with some celebrated British philosophers of the seventeenth century, got dominance in the nineteenth and the first half of the twentieth century. The schools of positivism, operationalism, pragmatism and similar trends are different species of empiricism. The common feature of all these schools is that they give primacy to sense experience and reject metaphysics. They also hold that sense perception is the only source of our knowledge about the physical world. Thus, metaphysical concepts should be excised from any physical theory, since they are not rooted in sense experience. The empiricistic philosophy, especially in its positivistic form, affected physicists tremendously, and in spite of the decline of positivism, in the second half of the twentieth century, the positivistic spirit is still dominant in physics circles.

Empiricists' claim that sense experience is the sole source of our knowledge and their denial of metaphysics can be refuted on the following grounds:

(a) We never encounter nature with empty minds. Our interpretation of experimental data depends to some extent upon presuppositions that are held by the investigator.

Andre Linde, an eminent Russian cosmologist, sums up the matter elegantly:

> *"When scientists start their work, they are subconsciously influenced by their cultural traditions." (13)*

(b) A scientist's work is always based; consciously or unconsciously, on some general principles. These so-called **guiding** or **regulative** principles are not deducible from experiments; rather, they are metaphysical assumptions which provide a framework for a scientist's line of research. For example, for Galileo the metaphysical doctrine that nature is describable by mathematics was a guiding principle. Similarly, simplicity was a heuristic principle for Newton or Einstein. As **Einstein** put it:

> *"A Theory is the more impressive the greater simplicity of its premises, the more different kinds of things it relates, and the more extended its area of applicability." (14)*

And in the words of **Heisenberg**:

> *"Mathematical simplicity ranks as the highest heuristic principle in exploring the natural laws in any field opened up as a result of new experiments. "(15)*

Furthermore, in their acceptance or refutation of theories, scientists often appeal to certain metaphysical principles. For example, when in 1926 **Max Born** denounced determinism in the atomic real, he admitted that his decision was philosophical:

> *"I myself am inclined to give up determinism in the world of atoms, but that is a philosophical question for which physical arguments alone are not decisive." (16)*

Similarly, quantum physicist's rejection of any sub-quantum level was a philosophically-based decision, not derivable from the requirements of physics. In **de Broglie's** words:

> *"The usual interpretation of the formalism of wave mechanics is purely probabilistic, I.e. no attempt is made to look beyond the laws of probability which we have explained, and the idea of a hidden reality, on which the laws of probability are based is rejected. This positivistic interpretation is based on the assertion that everything which is unobservable is non-existent and should have no place in theoretical physics. "(17)*

Contrary to what Empiricists claim, no collection of empirical data can ever lead directly to the construction of a theory. One has to assume some general principles or conditions or both before one can set up a theory. In fact, a theory can be considered to be a direct result of an experiment if we can show that there can be no alternative explanation for that experiment; but we can never claim this, and our past experiences have warned us against this type of mistake. The agreement between a theory and a set of experimental facts does not necessarily mean that it is a correct one, because, logically speaking, a conclusion can be drawn from different premises. Thus, we can never

claim that a theory is a direct result of experimental data. Infinitely many theories could be set up to explain a set of experimental facts. One has to add other assumptions or bring in other information to single out one of them. In the words of **George Ellis**:

> *«People need to be aware that there is a range of models that could explain the observations.... For instance, I can construct you a spherically symmetrical universe with Earth at its center; and you cannot disprove it based on observations.... You can only exclude it on philosophical grounds. In my view there is absolutely nothing wrong in that. What I want to bring into the open is the fact that we are using philosophical criteria in choosing our models. A lot of cosmology tries to hide that.» (18)*

(d) The number of experiments that verify a universal law of nature is always limited. Thus, in accepting a proposition as a general law one is exceeding experience. In **Max Born's** words:

> *"It looks as if science has a methodical way of finding causal relations without referring to any metaphysical principle. But this is a deception. For no observation or experiment, however extended, can give more than a finite number of repetitions, and the statement of a law – B depends on A – always transcends experience. Yet this kind of statement is made everywhere and all the time. Philosophers call it inference by induction, and have developed many a profound*

theory of it...I am willing to call induction a metaphysical principle, namely something beyond physics." (19)

A strict following of positivistic trends, however, reduces the whole physics to mere restricted prescriptions.

The conclusion we want to draw from our discussion in parts I, II, and III of this paper is that when we are dealing with fundamental problems in science, which are mostly metaphysical in nature, decision making is difficult within the science itself, and it is here that scientists use their metaphysical commitments and value judgments.

Conclusions

From the foregoing considerations, we conclude that:

1. There are many problems of human concern that scientists, as human beings, are confronted with, and for which science per se cannot deal with and has to appeal to different spheres. Specifically, there are some metaphysical issues that scientists, knowingly or unknowingly, have to handle. Thus, the culture of science is not a self- sufficient one and has to be supplemented with some staff from other cultures. Even Some eminent positivists have admitted that confinement to sense data does not lead us to anywhere. Thus, when Ayer was asked by Bryan Magee about the shortcomings of logical positivism, **Ayer** responded:

"Then, the reductionism just doesn't work. You can't reduce statements, even ordinary simple statements about cigarette cases and glasses and

ashtrays, to statements about sense data, let alone more abstract statements of science...If you go in detail very, very little survives. What survives is the general rightness of the approach." (20)

2. Some of the problems that science cannot singly handle are of real interest in the culture of religion and, in fact, some religions have definite positions about them. The comprehensibility of the world, provides a good example.

Thus, it appears that the two cultures of religion and science are not completely independent spheres and at least have some overlapping zones. These are predominantly in the metaphysical principles underling science and in the ethical issues. It is specifically in these two areas that world's major religions have contributed to the enrichment of science. For example, **Einstein** considered the idea of the comprehensibility of nature to have been taken from the sphere of religion:

"To this [sphere of religion] there also belongs the faith in the possibility that the regulations valid for the world of existence are rational, that is comprehensible to reason. I cannot conceive of a genuine scientist without that profound faith. The situation may be expressed by an image: science without religion is lame, religion without science is blind. "(21)

Similarly, **Andre Linde**, who is not a theist, believes that the idea of searching for a final theory of everything is rooted in the monotheistic religions:

"The whole of modern cosmology has been deeply influenced by the Western tradition of monotheism... the idea that it is possible to understand the universe through one ultimate "Theory of Everything" is an outgrowth of belief in one God. "(22).

and so is **John Barrow** who believes that our most engaging questions are rooted in our religious quest for meaning:

"Many of the deepest and most engaging questions that we grapple with till about the nature of the universe have their origins in our purely religious quest for meaning. The concept of a lawful universe- with order that can be understood and relied upon- emerged largely out of religious beliefs about the nature of God. "(23)

3. Another sphere in which both religion and science have to deal with concerns the applications of science and the problem of human responsibility. As science by itself cannot deal with ethical issues, the orientation has to come from a different source- a source which is concerned with human welfare and felicity. Here, religion has shown to be an effective source of insight. In the words of **John Brooke** (a leading contemporary historian of science):

"The direction and application of scientific research clearly can be different under different value systems. And since human values are often organically linked with religious beliefs, the latter can still be presented as relevant to the orientation of science and technology." (24).

In the light of the last three considerations, some scholars consider science and religion as two complementary spheres that have to be taken together to handle problems of human concern. As **Freeman Dyson** put it:

> *"Science and religion are two windows that people look through, trying to understand the big universe outside, trying to understand why are we here. The two windows give different views but they look out at the same universe. Both views are one-sided, neither is complete. Both leave out essential features of the real world. And both are worthy of respect. "(25)*

In my view, and here I am speaking as a Muslim scientist, religious worldview can provide a comprehensive framework in which both cultures of science and specifically religious culture can be accommodated, and this worldview can supply the metaphysical basis of science. This comprehensive worldview can cope with the whole spectrum of human experience, including ethical issues. My argument is based on the following premises:

- Scientific knowledge needs some metaphysical underpinnings and religion can provide a metaphysical basis for science at the fundamental level.
- Science cannot provide a basis for the proper applications of science in the human and environmental domain.
- Religion can account for the underlying order of the universe and provides a sound metaphysical explanation for the reliability of science, morality, and meaning.

Sources

(1) Max Planck, where is Science Going? (New York: W.W. Norton & Co. Inc., 1932), 214.

(2) Albert Einstein, Cosmic Religion, (New York: Convici Friede Publishers, 1931), 98.

(3) Paul Davies, "Taking Science on Faith", in The New York Times, (Nov. 24th, 2007).

(4) Roger Trigg, Rationality and Religion, (Oxford: Blackwell Publishers, 1998), 80-83.

(5) Charles H. Townes, "The Convergence of Science and Religion", in Zygon, 1, no. 3, (1966), 307.

(6) Karl Popper, "Natural Selection and the Emergence of Mind", in Evolutionary Epistemology, Rationality and the Sociology of Knowledge, ed. Gerard Radnitzky and William W. Bartley, (La Salle, Ill.: Open Court, 1987), 141.

(7) T.D. Singh and Ravi V. Gomatam, Synthesis of Science and Religion, (San Francisco: Bhaktivedanta Institute, 1987), 235.

(8) George F. R. Ellis, Before the Beginning, (London: Boyars/Bowerdean, 1993), 101.

(9) Philip Clayton, Mark Richardson, Robert J. Russell, and Kirk Wegter-McNelly, eds., Science and the Spiritual Quest: New Essays by Leading Scientists, (London:Routledge, 2002), 244.

(10) Freeman Dyson, "New Mysteries: The Price and Promise of Human Progress", in Science and Spirit, 11, no. 3, (July/August 2000), 16.

(11) Max Born, Physics in My Generation, (Oxford: Pergamon Press, 1956), 93-94.

(12) Roger Penrose, "A Theory of Everything?", in Nature, 433, (Jan. 20th, 2005), 259.

(13) Andre Linde, New Scientist, (Oct. 4,1998), 31.

(14) Philip Schilpp, Albert Einstein, Autobiographical Notes, (La Salle, Ill: Open Court, 1979), 33.

(15) Werner Heisenberg, Philosophical problems of Modern Physics, (Woodbridge, Conn.:OX Bridge, 1979), 58-59.

(16) John A. Wheeler and W. H. Zurek (eds.), Quantum Theory and Measurement, (Princeton: Princeton University Press, 1983), 54.
(17) Louis de Broglie, The Current Interpretation of Wave Mechanics, (Amsterdam:Elsevier Pub. Co., 1964), 20.
(18) W. Wayt Gibbs, "Profile: George F. R. Ellis", in Scientific American, 273, no.4, (1995), 55.
(19) Max Born, Natural Philosophy of Cause and Chance, (Oxford: Clarendon Press,1949), 6-7.
(20) Bryan Magee, Talking Philosophy, (USA: Oxford University Press, 2001), 107.
(21) Philip Schilpp and Albert Einstein, Philosopher – Scientist, (La Salle, Ill: Open Court, 1970), 285.
(22) Andre Linde, The Christian Science Monitor, (n, July 19, 1998), 34.
(23) John D. Barrow, "The Great Basilica of Nature", in Science & Theology News, (April, 2006), 16.
(24). John. H. Brooke, Science and Religion: Some Historical Perspectives, (Cambridge:Cambridge University Press, 1991), 336.
(25) Freeman Dyson, "Science and Religion can work together", in APS News, 9, no. 10, (2000), 5.

| CHAPTER SIX |

CREATION IN THE ISLAMIC OUTLOOK & IN MODERN COSMOLOGY

Introduction

The problem of creation has always been one of the major problems of human concern. But, prior to the twentieth century it was mostly dealt with by theologian and philosophers. It was during the first quarter of the twentieth century that scientific cosmology was developed and the problem of creation became the concern of scientific circles as well. In this paper, we shall discuss creation from the Quranic outlook and from the viewpoint of the Muslim theologians, philosophers and mystics. Then, we discuss this problem from the point of view of modern cosmology, describing various schools of thought prevalent there. Here we shall be brief, because there are already some excellent reviews available. Finally, we shall have a comparative study between the views of the Muslims theologians, philosophers and mystics and the dominant schools of thought in modern cosmology. We draw some conclusions from this study and present our view about the current state of affairs and about the cautions to be exercised in the future studies.

Islamic outlook

Creation in the Quran and the Islamic Tradition

According to the Quran, everything is created by God:

> *"... Say: `God is the Creator of everything; is the One, the Omnipotent." (13:16)*

And He is not only the Originator of the universe, and is its Sustainer:

> *"God is the Creator of everything, and He is in charge of everything." (39: 62)*

The Quran asserts that everything depends on God:

> *"Mankind, it is you who stand in need of God, and He is the All-sufficient, the Praiseworthy. "(35: 15)*

and to emphasize this dependence, the next verse mentions that if God willed, He could take us away and bring some new creation:

> *"If He so wished, He could take you away and bring some new creation." (35:16)*

It is also mentioned in the Quran that God's effusion is never withheld:

> *"Each We shall supply, these as well as those, with a gift from your Lord, and your Lord's gift was never withheld. "(17: 20)*

And that His favors are uncountable:

> *"... if you counted up God's favors, you would never [be able to] number them." (14: 34)*

There are verses in the Quran which have been interpreted by some Muslin scholars to indicate continuous creation:

> *"Everyone in Heaven and Earth asks for*

something from Him; each day He is at some task. "(55: 29)

"Where we worn out by the first creation? Yet they are in a quandary about fresh creation." (50: 15)

These are in fact, the verses which have been used by the Muslim mystics and Mulla-Sadra to infer the doctrine of continual creation.

There are frequent references in the Quran to the multitudes of universes. For example:

"All praise is for God, the Lord of the worlds." (1:2)

Some religious authorities and scholars have interpreted these references to "the worlds" as an indication of the existence of other worlds besides ours. For example, it is narrated from **Imam Muhammad al-Baqir** (A.S.) that:

"Maybe you see that God created only this single world and that God did not create Homo sapiens besides you. Well, I swear by God that God indeed created thousands and thousands of worlds and thousands and thousands of humankinds. You are in the last of these worlds and are the last of those human beings." (1)

In his celebrated commentary on the Quran, **Fakhr al-Din al-Razi**, an eminent Muslim theologian-philosopher, brings up the possibility of multiple worlds:

"It has been proven by evidence that God, the Exalted, is capable of actualizing all possibilities. Thus, be He Exalted is capable of creating thousands and thousands of worlds beyond this

world, each of which would be greater and more massive than this world ... and the argument of the philosophers for the uniqueness of this world is weak and poor; being based on invalid premises." (2)

Finally, it is recommended in the Quran that we should find out about how God did initiate the creation:

"Do they not see how God initiates the creation, and then reproduces it? Surely that is easy for God. Say: 'travel in the earth and see how God initiated the creation'. Then God will create another creation; surely God has power over all things. "(29:19-20)

Considering the possibility of other worlds – a possibility which can be inferred from the last two verses as well as other verses – this verse implies that we are instructed to find out through observation and reasoning, how did our own world originate.

Muslim Theologians

The early Muslim theologians claimed that the world was created in time. Their main argument for this belief was that if the world did not originate in time, then it would be co-eternal with God. Thus, it could not be caused by God. They believed that eternity belongs exclusively to God and everything else is temporal, and that createdness requires temporality.

Theologians' belief in the existence of an absolute beginning for time, requires that time be preceded by its

non-existence. Thus, they talked about the world being preceded by an imaginary extension.

In his celebrated book, "The Incoherence of Philosophers", **al-Ghazali**, an eminent **Asharite** theologian, accused philosophers of infidelity on three problems, the third one being their belief in the eternity of the world:

> *"Pronouncing them infidels is necessary in three questions. One of them is the question of the world's pre-eternity and their statement that all substances are pre-eternal ...*
>
> *These three doctrines do not agree with Islam in any respect. The one who believes them believes that prophets utter falsehood and that they said whatever they have said by way of [promoting common] utility, to give examples and explanation to the multitudes of created mankind. This is manifest infidelity which none of the Islamic sects have believed." (3)*

Imam **Fakhr al-Din Razi**, another eminent Asharite theologian, differed from al-Ghazali in this respect. In his view there is nothing in the Sacred books to indicate that the world had a temporal beginning, (4) and he attributes this to the complexity of the problem:

> *"The great prophets (A.S.) abstained from digging into this problem, and this indicates that it is so much difficult that human rationality cannot have access to it." (5)*

Some of the later Muslim theologian, however, have supported the view of the Muslim philosophers who believed there was no temporal beginning to the world.

In their view, the createdness of the world means its ontological dependence on God. To quote **Lahiji**:

> *"In the narrations from our infallible Imams, ... there is no explicit reference to either of the two views [temporality or eternity of the world], but the inferred meaning is that which implies dependence on the Creator alone ... the ancient and recent theologians believe in the temporality of the world. Sometimes, they even claim that there is a unanimous view on the temporal createdness. But the proof of this unanimity is difficult, and if there is a unanimity it is on the absolute createdness, without the condition of temporality or atemporality. Their rational arguments in this domain is quite weak, and the more recent philosophers have insisted on atemporality, and their doubt in this case is not without strength." (6)*

Muslim Philosophers

The early Muslim philosophers, led by **al-Farabi** and **Ibn Sina** (Avicenna), believed that the world had not originated in time, i.e. it is eternal. In their view the creation in time would have the following implications:

- It would mean that God is required for the creation of the world, but not for its sustenance.
- It would necessitate a change in the Divine nature, which is not permissible for an immutable God.
- It would require an interruption in God's effusion, which is inconsistent with the eternity of God's attributes, such as His creativity.

In this problem, both major schools of Islamic philosophy,

Peripatetics and Illuminationists, had the same position. **Tusi**, who was a Peripatetic philosopher, says in his commentary on Ibn Sina's al-Isharat wa al-Tanbihat that:

> *"Since the First Principle was for them [i.e. philosophers] eternal and perfect in action, they asserted that the world, which is His action, is eternal..." (7)*

And **Suhrawardi**, as an Illuminationist philosopher, says:

> *"The effusion is eternal because the cause is unchangeable and immutable. Thus, the world continues with His endurance." (8)*

In their view, creation meant an ontological relationship, and createdness meant ontological dependence which has its roots in the contingency of every existent, besides God. Thus, it is contingency, not temporality, that is the pre-requisite for createdness. The Necessary Being (God) confers existence upon the contingent beings. Such a process is called creation.

These philosophers believed that there is neither a beginning nor end to time. Theologians, however, believed in the existence of two boundaries for time. Otherwise, they claimed, this would require that time be co-eternal with God. In **Tusi's** word:

> *"The [temporal] createdness of the world requires its [i.e. time's temporal] createdness." (9)*

Here, Tusi speaks as a theologian.

In refuting philosophers' claim, **al-Ghazali** pointed out that if philosophers had accepted the finitude of space,

why couldn't they accept the finiteness of time? (10) In response, to al-Ghazali, the contemporary Persian philosopher **M. Mutahhari** pointed to the difference between temporal and spatial dimensions: the elements of space can co-exist, but the elements of time are mutually exclusive. There is a relation of potentiality and actuality between the elements of time, but there is no such relation between the elements of space. (11) **Einstein**, whose special theory of relativity has been used by some people to negate any distinction between space and time coordinates, disapproved the identification of time as a dimension of space:

> *"Time and space are fused into one and the same continuum, but this continuum is not isotropic. The element of spatial distance and the element of duration remain distinct in nature." (12)*

What we mentioned above was the belief of the major schools of Islamic philosophy. But there were some individual philosophers in the Islamic world whose ideas on the problem of the creation of the world were different. For example, **al-Kindi** argued that the world is created in time. (13) Similarly, **Maimonides** claimed that the Aristotelian arguments for the eternity of the world were not conclusive arguments and that temporal creation is a more plausible alternative. (14) On the other hand, **Muhammad ibn Zakariyya al-Razi** believed in five eternals: God, the universal soul, first matter, absolute space and absolute time. (15) But, before Mulla-Sadra, the dominant view was atemporal createdness and it was

shared by both Peripatetic and Illuminationist philosophers. Nevertheless, **Ibn Sina's** concluding words on this problem are very cautious and extremely instructive. In his al-Isharat wa al-Tanbihat, which was one of his latest books, he first described various schools of thought on the problem of creation. Then, he left the choice to the readers, but gave them three recommendations:

(i) to be firmly committed to the unity of God

(ii) to avoid prejudices

(iii) to use their intellectual capacity

In his words:

> *"Thus, the schools of thought on this problem are what we described. You must choose one of them, after you have subscribed to the unity of God, using your faculty of intellect, rather than your prejudices." (16)*

Muslim Mystics

Muslim mystics introduced the doctrine of the recreation (or perpetual creation) of the world at every instant. According to this doctrine, the universe is annihilated and recreated at every moment, i.e., there is a continuous creation going on. One of the earliest exponents of this doctrine is the Persian mystic –philosopher **`Ayn al-Qudat Hamadani** of the 12th century. In his view, everything which comes into being is going to be annihilated instantaneously and then it is immediately recreated again. Thus, God is not only the originator of the universe, but is its constant Creator. Everything derives its existence from Him. But the ontological relationship

between the two must be renewed at every moment. (17) This renewal is due to two facts:

(i) The ontological contingency of all things

(ii) Constant effusion from God.

Thus, every existent, due to its ontological contingency, takes off the garment of existence once it comes into being. But at the same time, God's effusion confers upon it a new garment of existence. We do not see this renewal, because it takes place instantaneously. **Hamadani** offers a good analogy:

> *"Small children, observing a lamp burning continuously, would naturally think that what they see is one single flame. But the grown ups know very well that it is a series of different flames appearing and disappearing moment by moment. And from the viewpoint of the mystics this must necessarily be the case with everything in the world except God." (18)*

Later Mystics, following the lead of Hamadani and the eminent mystic Ibn Arabi, advertised the thesis of recreation. Here I simply quote two well-known Persian mystic–poets, Shabistari and Rumi. In **Shabistari's** words: The world is this whole, and in every twinkling of an eye, it becomes non-existent and endures not two moments.

> *There over again another world is produced, every moment a new heaven and a new earth. Things remain not in two moments, the same moment they perish, they are born again.*

And in Rumi's words:

Every Instant then thou art dying and returning,
Mustafa [the prophet] declared that this world is (but) a moment.

Every moment the world is renewed, and we are unaware of its being renewed whilst it remains [the same in appearance].

Life is arriving a new, like a stream, Though in the body it has the same semblance of continuity.

Mulla-Sadra

We have separated the discussion of **Mulla-Sadra**'s view on this problem from the rest of Muslim philosophers, because he established an independent school of thought in which he took some elements from various schools of philosophy, from mystics and from the Quran and the Islamic tradition and combined them to develop his own school of philosophy, the so-called '**al-Hikmat al-Mutaliayh**'.

Mulla-Sadra's approach to the problem of creation is based on his doctrine of trans-substantial motion. Earlier Muslim philosophers had restricted motion to some categories of accidents (e.g. quantity and quality), but they had denied the possibility of motion in the category of substance. Mulla-Sadra argued that changes in an accident requires changes in the substance to which the accident belongs, because accidents have no independent existence of their own.

According to **Mulla-Sadra**, the essence of everything is continually renewed through the process of trans-substantial motion. In other words, every existent is in

constantly renewed creation at every moment:

> *"There is absolutely no ipseity or individual – be it celestial or elemental, simple or composite, substance or accident – but that its non-existence precedes its being in time, and its being likewise precedes its non-existence in time. In general, every body and every bodily thing whose being is in any way connected with matter is constantly renewed in its ipseity and impermanent in its being and its individuality." (19)*

All existents have this constant renewal in their nature. Thus, every existent is different now from what it was before. What it is now was non-existent before. Thus, the doctrine of creatio ex nihilo holds at each instant, i.e. we have a continuous effusion of existence from the ultimate source of existence.

Mulla-Sadra confirms the doctrine of temporal createdness of the Muslim theologians, but unlike them he does not restrict temporal creation to a specific time in the past. Rather, it is a continual re-creation, without having an absolute beginning in the past. Thus, as earlier Muslim philosophers had emphasized, while nothing is eternal, there is no absolute beginning to time:

> *"Thus, the continuation of the effusion of the absolute bountiful and the eternity of the creation of the true Creator became clear from what we said ... But the continuation of the effusion of the Creator and His creation does not require the eternity of contingents." (20)*

In short, in Mulla-Sadra's view, nothing precedes time and motion but God.According to Mulla-Sadra all Divine religions believe in the createdness of the universe, and by that they mean temporal createdness. The creation did not take place in time, but occurred with time. In fact, time is the measure of the universal trans-substantial motion. The universe can be considered as an infinite series of continual creations. In **Mulla-Sadra's** view, the whole universe, is nothing but its parts, and the [temporal] creation really refers to them, rather than to the whole:

> *"The whole has no existence besides the existence of the parts. The parts are numerous. Thus, their [temporal] creation is numerous." (21)*

The major difference between Mulla-Sadra's view and that of Muslim Mystics, in the problem of creation, is that for Mulla-Sadra, the state of the universe at any instant becomes matter for new forms which are conferred upon it by God, while for the Muslim Mystics the universe is annihilated and recreated at every instant. The first is called "dressing after dressing" and the latter is called "dressing after undressing".

Modern Cosmological Models of Creation

Big Bang Model

Scientific Cosmology started with Einstein's 1917 celebrated paper: "Cosmological Considerations on the General Theory of Relativity". (22) In this paper Einstein applied his general theory of relativity to the universe. Einstein's equations have different solutions corresponding to different distributions of fields and matter. But the theory

by itself cannot select a particular one. Among them, there are solution which predict an expanding universe from an extremely hot and dense conditions at t = 0. From 1917 till the presentation of E. Hubble's results in 1929, the dominant view was that our universe is a static one. There were two static models available: Einstein's closed universe and de Sitter's open, infinite and empty universe.

In 1922 Alexander Friedman and in 1927 George Lemaitre presented solutions of Einstein's equations which indicated the expansion of the universe. Einstein first rejected Friedman's solution in view of its prediction of singularity, but in 1923 he accepted Friedman's solution. In 1929 Hubble noticed a red shift in the spectra of galaxies, which was proportional to their distance from our galaxy. This was interpreted as a "Doppler effect", which meant that galaxies are receding from our galaxy with a speed proportional to their distances, i.e. the universe is expanding.

In the late 1940's some people including Fred Hoyle, Herman Bondi and Thomas Gold presented different versions of the so-called "steady state theory", which assumed that the universe is both spatially and temporally homogeneous, i.e. it is external. **Hoyle** explicitly mentioned that the creation could not be causally explained and that the assignment of a beginning to the universe is against the spirit of scientific enquiry:

> *"It is against the spirit of scientific enquiry to regard observable effects as arising from 'causes*

unknown to science' and this in principle is what creation – in – the – past implies." (23)

During 1950's both the Big Bang theory and the steady state theory were popular. The discovery of the microwave background radiation

In 1965 gave a solid support to the Big Bang theory and weakened the steady state theory.

In the late 1960's several people, notably Hawking and Penrose proved that under some very reasonable assumptions cosmological models governed by general relativity exhibit a singularity at t = 0, which means that the universe must have started in a space-time singularity. The Big Bang could be combined with infinite time, leading to an oscillating universe, i.e., an infinite series of expansions followed by contractions. The oscillating universewaspopularwithsomephysicistsandcosmologists, but it has become less popular on physical grounds. (24)

Reactions to Standard Big Bang Model of Universe

There have been six major reactions to the Big Bang model of the universe:

(i) The theistic interpretation of the standard Big Bang cosmology is, to paraphrase **W. L. Craig**, the classical doctrine of creatio ex nihilo: that a finite time ago God brought the universe into being with a material cause and fashioned the cosmos according to His design. The argument for the existence of God can be expressed in the forms of the following syllogism: (25)

• Whatever begins to exist has a cause.

• The universe began to exist.
• Therefore, the universe has a cause.

This interpretation of Big Bang was welcome by Pope Pius XII in 1951, and some scientists, philosophers and theologians throughout the Muslim and Christian world have embraced it with enthusiasm. For example, **Ted Peters** sees the doctrine of creatio ex nihilo in Christian theology in "consonance" with the problem of t=0 in Big Bang cosmology:

> *"If we identify the concept of creation out of nothing with the point of temporal beginning or perhaps the source of the singularity, we have sufficient consonance with which to proceed further in the discussion." (26)*

(ii) The other prominent reaction to Big Bang has been by those who saw Big Bang as a support for theism. As **Paul Davies** put it:

> *"A singularity is the nearest thing that science has found to a supernatural agent." (27)*

These people have tried to eliminate the singularity at t = 0 by various physical and mathematical tricks including an appeal to various theories of quantum gravity. Here, there are models with a background space-time in which the universe emerges as a quantum fluctuation of vacuum, and models in which space-time arises out of pure chance from a space with no boundary.

(iii) Some scholars have accepted the singularity and the existence of temporal beginning to the universe, but they deny that the creation of the universe needs a cause.

Q. Smith, e.g. believes that the universe, including the initial singularity sprang into being out of nothing without a cause:

> *"There is no good reason to believe that there is a sound a posteriori or a priori argument for a cause of the big bang. Thus, we reach a general conclusion: there is no philosophy of big bang cosmology that makes it reasonable to reject the fundamental thesis of big bang cosmology: that the universe began to exist without a cause." (28)*

(iv)Some scholars believe that the doctrine of **creatio ex nihilo** does not imply temporal createdness; rather, it implies ontological dependence on God. Thus, the singularity at t=0 should not be identified with the doctrine of creatio ex nihilo. In **Arthur Peacocke's** words:

> *"The principal stress in the Judeo-Christian doctrine of creation is on the dependence and contingency of all entities and events, other than God himself: it is about a perennial relationship between God and the world and not about the beginning of the Earth or the whole universe at a point of time." (29)*

(v)In the last forty years, the old idea of continuing creation (**creatio continuata**) has been revived in different senses:

• **Creatio continuata** refers to the idea of change within an already existing matter. In the words of **Ian G. Barbour**:

> *"Continuing creation expresses the theme of God's immanence and participation in the ongoing word. God builds on what is already there; each*

successive level of reality requires the structure of lower levels." (30)

• **Creatio continuata** means the continuation of the original creation out of nothing. As **Wolfhart Pannenberg** put it:

> *"The creatio continuata formula presupposes the strict conception of creatio ex nihilo in as much as it characterizes God's preserving activity as the continuation of the creation out of nothing. For this reason alone the idea of a continuing creation cannot be set in opposition to the creatio ex nihilo formula." (31)*

• For **Philip Hefner**, creation refers not only to the original creation, but it also includes God's continuing sustenance of the world:

> *"Creation for Christian theology is by no means limited to protology. It is not limited to what happened at the beginning when time was first created. Creation also refers to God's ongoing sustaining of the world. Every moment of the world's existence depends upon the ongoing grace of God." (32)*

The last sentence reminds one of the Muslim mystics and Mulla-Sadra.

• **Creatio Continuata** means that at every moment the universe depends on God, irrespective of whether there was an absolute beginning. In the words of **Keith Ward**:

> *"The Big Bang has not the slightest theological significance. It does not matter whether the world began with a bang or whether it began at all. It might*

always have been there. Theologians have always agreed that this does not make any difference. When you say the God "creates" the Universe, you just mean that everything – however long it has been there – always depends, at every moment of time, upon God. That is all you mean. It's a pity that some physicists use the word "creation" when they actually mean "origin" of the Universe. Creation isn't at the beginning; it is now and always." (33)

and

"But a more satisfactory notion of creation is that God at every moment sustains the universe, so that every moment is a moment of creation." (34)

• **Creatio continuata** refers to the continuous **creatio ex nihilo**. This is exemplified, e.g., by the steady state theory of Hoyle et al. in which there is continual creation of matter out of nothing. As **Bondi** put it:

"There is going on everywhere and at all times a continual creation of matter, the appearance of atoms of hydrogen out of nothing." (35)

(vi) Some people admit the temporality of the universe, but they believe in the eternity of the laws of physics and think that these laws are enough to put the universe into existence. **Paul Davies** elaborates on this position:

"The possibility that given the laws of physics, a universe can appear spontaneously, rests on the "prior" existence of these laws of physics. Given, the laws, the universe can take care of itself. But where do the laws come from?

...the laws are logically prior to the universe. If this were not so, we should have to suppose that the whole package, the universe plus laws, just popped into existence for no reason. So, I contend that the laws enjoy some sort of timeless transcendent, Platonic existence." (36)

Quantum Cosmological Speculations

As we mentioned, the singularity theorems indicate that all models of expanding universe that satisfy certain reasonable assumptions start with a singularity, at which the density and temperature become infinite and Einstein's equations cease to be valid. **Einstein**, himself, had the following insight about the initial singularity:

"For large densities of field and matter, the field equations and even the field variables which enter into them have no real significance. One may not therefore assume the validity of the equations for very high density of field and matter; and one may not conclude that the 'beginning of the expansion' must mean a singularity in the mathematical sense. All we have to realize is that the equations may not be continued over such rigions." (37)

To overcome this obstacle, some people have argued that as we go backward toward the singularity, when we go beyond Planck's time, the first 10-43 sec of the early universe, the universe becomes ultra-microscopic and the quantum mechanical effects become important.

Thus, we have to use a proper quantum theory of gravity. There is a hope that this theory will not involve singularities.

During the last three decades, the standard Big Bang model has been replaced by models in which the universe arises by pure chance from a quantum mechanical vacuum or from a space-time with no-boundary. Here we say a few words about some of these models.

• In 1973 **Edward Tryon** suggested that our universe originated as a quantum fluctuation of the vacuum – the vacuum of some larger space in which our universe is embedded. (38)

• In the early 1980's, **Alexander Vilenkin** of Tufts university introduced a model in which the universe was created through a quantum tunneling effect – a tunneling from a state with no classical space-time to a de-Sitter space. (39)

• In 1983, **Hartle** and **Hawking** suggested a model in which the initial singularity is avoided by making time less well-defined in the early universe. (40) Starting from the Wheeler – Dewitt equation, they tried to construct the wave function of the universe which represents the amplitude for the creation of the universe from finite quantum fuzz. In their model, the space-time diagram of the universe does not start from a single point, but from a curved surface with no-boundary, i.e., their universe has a finite past, but no initial singularity. In this no-boundary proposal there is no beginning for the universe, and therefore Hawking sees nothing left for the Creator to do. In **Hawking's** words:

> *"There would be no singularities at which the laws of science broke down, and no edge of*

space-time at which one have to appeal to God or some new law to set the boundary conditions for space-time." (41)

and:

"But if the universe is really completely self-contained, having no boundary or edge, it would have neither beginning nor end. what place, then, for a Creator?" (42)

But, as **Don Page** pointed out, (43) Hawking's objection does not apply when one holds that God created the universe and sustains it, as it is believed in the monotheistic religions, rather than just interfering at the beginning. Hawking admits that the existence of an edge for space-time implies the existence of God, which is what the early Muslim theologians believed. But he departs from their position, by denying the existence of this edge. Nevertheless, as **John Polkinghorne** pointed out, the 'no boundary' condition of Hawking is itself a boundary condition. (44) Other cosmologists (e.g. Linde and Penrose) have imposed other boundary conditions.

Islamic Cosmological Doctrine vs. Modern Cosmological Models

The Islamic schools of thought about the creation could be summarized in the following categories:

(i) Theologians' belief in temporal createdness of the universe.

(ii) Philosophers' belief in the eternity of the world and its ontological dependence on God.

(iii) Mystics' and Mulla-Sadra's views about perpetual creation (continual recreation) of the world.

All of these views are present in the current schools of cosmological thought – among cosmologists, theologians and philosophers. For example, the temporal createdness of the universe was hailed by E. Whittacker, the eminent British physicist in 1951, and today, it is seriously defended, e.g., by physicist H. Ross and philosopher W. L. Craig. It is amusing that even those, like Hawking, who deny temporal createdness of the universe, share Muslim theologians' understanding of a created universe. Similarly, the view of the Muslim philosophers about the ontological dependence of the world on God is shared by some contemporary scientists, theologians and philosophers (e.g. P. Hodgson, A. Peocoke, ...). Likewise, the doctrine of continual reaction of the Muslim mystics and Mulla-Sadra is echoed in the thesis of continuous creation of some contemporary Christian theologians, though in different senses. The closest view to Mulla-Sadra's is that of K. Ward.

Finally, the idea of the existence of multiple worlds suggested by some Quranic verses and Islamic traditions is seen in the work of some modern cosmologists, who are not necessarily theists, but believe in this idea either on physical grounds or to remove the need for God. The idea of many worlds has been brought up in modern cosmology in several contexts (the reduction of the wave function of the universe, oscillating model of the universe, anthropic principle, etc.). One of the most recent ones is the chaotic

inflationary scenario. In this scenario, the universe started in a chaotic state. Then, some regions underwent inflation and the amount of inflation was different from region to region. Each inflated region resembled a bubble with smooth conditions. (45) The universe we live in is one bubble among other bubbles, with particular set of fundamental constants. In **Andrei Linde's** version of chaotic inflation, inflation is a potentially self-reproducing process. (46) The fluctuations produced by inflation induce further inflations in small subregions of the inflating bubbles. The whole network of inflating bubble universes need not have any beginning. Of course, the eternal inflationary scenario is not testable by observations, and in this scenario, the universe is different beyond our horizon of possible observations. Thus, it is not possible to answer questions about the origin of the whole universe.

Conclusion

In my opinion, there are lots of confusion and fallacies concerning the problem of creation, especially among modern cosmologists. This, in my humble view, is the result of their lack of philosophical understanding. The problem of creation is not a matter of physics alone. It needs theological and philosophical reflection as well. Here, I would like to summarize some of the misunderstandings prevalent among the practitioners of modern cosmology.

(i) The use of Big Bang cosmology for the affirmation or the denial of temporal createdness is a clear

misunderstanding of both cosmology and creation (as understood in theology and philosophy).

(ii) We still do not have a successful unification of quantum theory and general relativity, i.e., a coherent quantum theory of gravity. All of the current works on quantum cosmology are based on assumptions that are thought to be valid when we get that theory. But, as **Isham** pointed out, it is not obvious that: (47)

- Relativity can be quantized in the way it has been done so far.
- A unification of general relativity and quantum theory can be achieved without invoking radical conceptual changes in either
- The prevalent concepts of space, time and matter remain intact in the region of the Planck length.
- The concept of probability can be extended to quantum cosmology without getting into conceptual problems.

(iii) The beginning implied by the Big Bang models is not necessarily an absolute beginning, because

- The initial singularity is predicted by present theories, which are not valid at the Big Bang anyhow.
- Even if there were an absolute beginning to the world, science could never reveal it. In **Saint Thomas Aquinas'** words:

> *"We hold by faith, and it cannot be proved by demonstration that the world did not always exist ... the reason being that the newness of the world cannot be demonstrated by the word itself." (48)*

and in the words of **J. M. Zycinski**:

> *"There are no physical of philosophical means*

> *that would make it possible to prove that at this very moment our universe emerged from ontologically understood nothingness. (49)*

The reason is that we cannot say what happened before the Planck time (about 10-4 sec after Big Bang), and we cannot ever get to t = 0. So, the identification of the initial singularity with creatio ex nihilo is doubtful. As **Hawking** and **Ellis** put it:

> *"The result we have obtained support the idea that the universe began a finite time ago. However; the actual point of creation, the singularity, is outside the scope of presently known laws of physics." (50)*

• All models of Big Bang assume infinitely dense and hot matter plus certain physical laws. Thus, as **Isham** pointed out these models describe 'the creation of the universe from an initial point', rather than a 'creation from nothing'. (51) Thus, the Big Bang is really a change, rather than creation.

• The vacuum that quantum cosmologists talk about is a particular state of quantum fields, subject to many constraints, including the principles of quantum mechanics and the principles of logic. Thus, it should not be confused with metaphysical nothingness which is implied in the **creatio ex nihilo**.

• The Big Bang inferred from the present expansion of the universe could indicate only the beginning of one world - our own world. There could have been other worlds before the present one, or there could be others alongside the

present one, as some of the inflationary models claim. **M. Mutahhari**, the eminent Persian philosopher expressed the matter elegantly (in the mid 1970's):

> *"Physicist could be right that back in ten billion years ago the world did not exist with the present laws. But, how do we know that there were not other worlds before, with different laws." (52)*

and in the words of **Peter Hodgson**, the British nuclear physicist:

> *"The cosmic singularity seems to be the ultimate limit of science. This singularity is not necessarily the beginning of the universe; there may have been a previous contraction." (53)*

(iv) Some contemporary cosmologists have been very arrogant in making big claims. For example, some cosmologists claim that they can explain the universe completely through science alone, and that it is self-created. Had we a successful and complete quantum theory of gravity, these claims could, in some sense, be justified. But we do not have such a theory. Rather, we have highly speculative schetches of the alleged general features of this theory – features that are based on our present fragmentary knowledge. **Chris Isham** has put the matter elegantly:

> *"Major conceptual problems arise when trying to apply quantum theory to the universe as a whole. This problem is so severe that many highly respectable theoretical physicists think that the whole subject of quantum cosmology is*

misconceived. It follows that theories of the quantum origination of the universe are highly speculative and do not have anything like the scientific status of, say, even the more exotic branches of modern elementary particle physics." (54)

When our major theories, such as quantum theory, have conceptual problems and we don't have a successful marriage of quantum theory and general relativity, it is unwise to make conclusive inferences from them. The American astrophysicist **J. Bahcall** has articulated this point:

"I personally feel it is presumptuous to believe that man can determine the whole temporal structure of the universe, its evolution, development and ultimate fate from the first nanosecond of creation to the last 1010 years on the basis of three or four which are not very accurately known and are disputed among the experts. That I find, I would say, almost immodest." (55)

The grand masters of physics were very humble and cautious when the problem of the origin of the universe was concerned. For example, in 1930, the eminent physicist **J. J. Thomson** gave the following warning:

"I think this is a warning against taking too seriously speculations about either the remote past or the remote future of the universe, founded as they must on the physics of the moment." (56)

This warning was given at a time when both major theories of physics, general relativity and quantum mechanics,

were taken to be beyond any doubt, and the end of science seemed to be in sight, and Gödel's incompleteness theorem had not arrived on the scene. According to this theorem, in any axiomatic system which includes arithmetic, there are statements whose truth or falsity cannot be decided within the system. Scientific cosmology is such a mathematical system. Thus, we cannot expect it to answer all of our cosmological questions. Serious conceptual problems of quantum mechanics plus the inability of physicists, so far, to give a coherent formulation of quantum gravity plus the existence of Gödel's theorem make it necessary to avoid any conclusive claims about the origin of universe. Some physicists (among them both theists and atheists) believe that science will finally settle this problem by itself. In the words of **Ian G. Barbour**:

> *"It is equally impossible to imagine a beginning of time or an infinite span of time. Both are unlike anything we have experienced. Both start with an unexplained universe. I will agree that the choice of theories could be made on scientific grounds alone, and that the difference between them is only of secondary importance religiously." (57)*

But, I do not believe that science alone can ever settle the problem of the absolute beginning of the universe, though I agree with Barbour that either way (temporality or atemporality of the universe) is of secondary importance theistically.

I personally, recommend the following strategy: we should explore our universe, by science, as much as we can, but we

must avoid making claims about the absolute origination of the universe on physical grounds. Philosophy and theology can save us from making unsound exaggerated scientific claims, and can give us a proper metaphysical framework for our science and a ground for our being. In this framework, the description of the physical aspects of the universe is left for scientific investigation, but the ultimate explanation of the universe is provided by God. **R. J. Russell** puts the mater elegantly:

> *"Whether the origin of the universe as we know it involves a previous quantum superspace, or whether the universe had an absolute beginning 15 billion years ago, the universe is contingent: it does not seem to include the grounds for its own existence, it does not offer an ultimate explanation of why anything at all exists in the first place, and therefore it points to that on which all beings necessarily exist – God." (58)*

Sources

(1) al-Saduq, al-Tawhid (Qum: Manshourat Jamiah al-Mudarresin fi al-Hawzah al-Ilmiyyah,?). 277.

(2) al-Razi, Fakhr al-Din, al-Tafsir al-Kabir (Beirut, Dar Ihy al-Turath al-Arabi,?), Vol. 1, 6-7.

(3). al-Ghazali, Abu Hamid Muhammad, The Incoherence of the Philosophers, trans. by M. E. Marmura (Provo, Utah: Brigham Young University Press, 1977), 230.

(4) al-Razi, F., al-Matalib al_Aliyah min al-Ilm al-Ilahi (Beirut: Dar al-Kitab al_Arabi, 1987), Vol. 4, 29.

(5) Ibid., 33.

(6) Fayyaz Lahiji, Abd al-Razzaq, Gowhar-e Murad (Tehran: Irshad-e Islami, 1372 H.), 229-230.

(7) Ibn Sina, Abu Ali, al-Isharat wa al-Tanbihat (Tehran: Heidari Pub., 1379 H.), Vol. 3, 82.

(8) Suhrawardi, Shahab al-Din, Hikmat al-Ishraq in Majmouah Mosannefat Sheikh Ishraq, Vol. 2 (Tehran: Moassesah Motaliat we Tahqiqat-e Farhangi, 1372 H.), 181.

(9) Tusi, Nasir al-Din, Tajrid al-Iateqad (Maktab al-Aalam al-Islami, 1407 H.), 185.

(10) al-Ghazali, op. cit., 32-36.

(11) Mutahhari, M., Harakat wa Zaman dar Falsafeh-e Islami (Intesharat-e Hikmat, 1375 H.), Vol. 3, 234-235.

(12) Quoted in W. L. Craig and Q. Smith, Theism, Atheism and Big Bang Cosmology (Oxford: Clarendon Press, 1993), 294.

(13) Nasr, S. H. and Leaman, History of Islamic Philosophy (London: Routledge, 1996), Vol. 1, 110.

(14) Ibid., 688.

(15) Sharif, M. M., A History of Muslim Philosophy (Wiesbaden: Otto Harrassowitz, 1963), Vol. 1, 441.

(16) Ibn Sina, op. cit., Vol. 3, 138.

(17) Izutsu, T., Creation and the Timeless Order of Things (Ashland,

Oregon: White Cloud Press, 1994), 151-158.
(18) Ibid., 167.
(19) Morris, J. W., The Wisdom of the Throne (Princeton: Princeton University Press, 1981), 119-120.
(20) Mulla-Sadra, al-Hikmat al-Mutaaliyah fi al-Asfar al-Aqliyyah al-Arbaah (Beirut: Dar Ihya al-Turath al-Arabi, 1981), Vol. 7, 305-306.
(21). Ibid., 297.
(22) Einstein, A., 1917, "Cosmological Considerations on the General Theory of Relativity," Eng. trans. in The Principle of Relativity, ed. by W. Perrett and G. B. Jeffery (New York: Dover, 1952).
(23) Hoyle, F., "A New Model for the Expanding Universe," Monthly Notices of the Royal Astronomical Society, 108 (1948), 372-382.
(24) Craig, W. L. and Q. Smith, op. cit., 47-56.
(25) Ibid, 284.
(26) Peters, Ted, "On Creating the Cosmos" in Physics, Philosophy and Theology (Vatican City State: Vatican Observatory Pub., 1988), 291.
(27) Davies, P., God and the New Physics (London: Penguin Books, 1988), 55-56.
(28) Smith, Q., "Did Big Bang Have a Cause," British Journal for the Philosophy of Science 45 (1994), 666.
(29) Peacocke, A. R., Creation and the World of Science: The Bampton Lectures, 1978 (Oxford: Clarendon Press, 1979), 78.
(30) Barbour, I. G., Religion and Science: Historical and Contemporary Issues (HarperSanFrancisco, 1997), 214.
(31) Quoted in Worthing, M. W., God, Creation and Contemporary Physics (Minneapolis: Fortress Press, 1996), 113.
(32) Hefner, P., "The Evolution of the Created Co-Creator," Cosmos as Creation, ed. by Ted Peters (Nashville: Abdingdon Press, 1989), 227.
(33) Stannard, R., Science and Wonders (London: Faber and Faber, 1996), 16.
(34) Ward, K., God, Chance and Necessity (Oxford: One World, 1996), 79.
(35) Quoted in Worthing, M. W., God, Creation and Contemporary Physics, 116.
(36) Davies, P., "The Birth of the Cosmos," God, Cosmos, Nature and Creativity, ed. by Jill Gready (Edinburgh: Scottish Academic Press, 1995), 19-20.
(37) Einstein, A., "On the Cosmological Problem," Appendix in The

Meaning of Relativity (London: Methuen,1950),123.
(38) Tryon, E. P., "Is the Universe a Vacuum Fluctuation," Nature, 246 (1973), 396-397.
(39) Vilenkin, A., "Creation of Universe from Nothing," Physical Letters B, 117, P. 25; Physical Review D, 27, 12 (1983), 2848.
(40) Hartle, J. and S. Hawking, "Wave Function of the Universe," Physical Review D, 28 (1983), 2960-2975.
(41) Hawking, S. A Brief History of Time (London: Bantam Press, 1988), 136.
(42) Ibid., 141.
(43) Page, Don N., "Hawking's Timely Story," Nature, 332 (1988), 742-743.
(44) Polkinghorne, J., "The Mind of God," The Cambridge Review, 113, No. 2316 (1992), 4.
(45) Barrow, J. D. and R. Matzner, "The Homogeneity and Isotropy of the Universe," Monthly Notices of the Royal Astronomical Society, 181 (1977), 719-28.
(46) Linde, A., "The Inflationary Universe," Physics Today, 40, No. 9 (1987), 61.
(47) Isham, C., "Quantum Theories of the Creation of the Universe," Quantum Cosmology and the Laws of Nature, ed. by R. J. Russell. et al. (Vatican City State: Vatican Observatory, 1993), 77-78.
(48) Quoted in Max Jammer, Einstein and Religion (Princeton: Princeton University Press, 1999), 251.
(49) Zycinski, J. M., "Metaphysics and Epistemology in Stephen Hawking's Theory of the Creation of the Universe," Zygon 31, No. 2 (1996), 271.
(50) Hawking, S. and G. Ellis, The Large Scale Structure of Space -Time (Cambridge: Cambridge University Press, 1973), 364.
(51) Isham, C., "Creation of the Universe as a Quantum Process," Physics, Philosophy and Theology, 398.
(52) Mutahhari, M., Sharh-e Mabsout-e Manzoumah (Intesharat-e Hekmat, 1369 H.), Vol. 4, 109.
(53) Hodgson, P., Science and Creation (Oxford: The Farmington Institute for Christian Studies,), 1-3.

(54) Isham, C., Quantum Cosmology and the Laws of Nature, 54-55.

(55) Regis, E., Who Got Einstein's Office? (London: Simon & Schuster, ?), 210-211.

(56). Quoted in Jaki, S., The Relevance of Physics (Edinburg: Scottish Academic Press, 1970), 449-450.

(57). Barbour, Ian G., "Creation and Cosmology," Cosmos and Creation, ed. by Ted Peters, 122.

(58) Russell, R. J., "Cosmology from Alpha to Omega," Zygon, 29, No. 4 (1994), 563.

| CHAPTER SEVEN |

DESIGN ARGUMENT FOR THE EXISTENCE OF GOD

Introduction

Here we present an argument for God's existence, based on scientific evidences. This argument consists of two premises and a conclusion. The argument goes as follows

- The world is orderly (minor premise)
- Any order has a designer (major premise)
- The world has a designer (conclusion)

Scientific evidences prepare the ground for the first claim. A deep study of the world indicates that the structure of the world and its parts are designed, i. e. everything has a proper place, and has been designed for a purpose.

The idea of order indicates a purposeful process. As **Ayatullah Sobhani**, an eminent Muslim theologian says:

> *"Order is a harmonious relation between the parts of a system in order to achieve a definite goal, in such a manner that every part of the system complements other ones, and the lack of each part deprives the collection from accomplishing its role." (1)*

Our observation of natural phenomena indicates the existence of a purposeful order in the natural phenomena. It seems that there exists a logical relation between order

and the existence of purpose. Because the existence of proper relations is an indication of the presence of intelligence.

The design argument consists of two parts: One is based on senses and the other one is based on intellect. The minor premise: Our observations are indicative of a purposeful order in nature. The major premise: The order that we see in nature indicates the presence of intellect in its generation. The conclusion: the best explanation for the presence of order in nature is that there has been an intelligent design at work.

Hoyle, an eminent cosmologist of our time, says:

> *"A common sense interpretation of the facts suggests that a superintellect has monkeyed with physics, as well as with chemistry and biology, and that there are no blind forces worth speaking about in nature.» (2)*

In response to the question of whether the efficient cause is sufficient to explain the presence of order, some people have argued that it is not sufficient; rather, there is a need for the teleological cause as well, i.e., We need to assume that the agent has intelligence and wisdom. (3)

The history of design argument

The history of this argument goes back to Plato's Timaeus, and it was the last argument of Thomas Aquinas. The Holy Qur'an refers to order as:

> *"And you see mountains, which you supposed to be stationary, while they drift like passing clouds- the*

handiwork of Allah who has made everything faultless". (27: 88)

and in some verses order is interpreted as assessment, i.e. there has been some kind of calculation in the process of creation.

In the last few centuries, the most famous expression of the design argument has been by **William Paley** in 1802, in his book entitled "natural philosophy".

In Paley's expression, if you see a clock on the ground, it is unreasonable to attribute its shaping to the action of wind and rain. We are faced to attribute the presence of order in a complex system like a clock to an intelligent agent. (4)

Now, according to Paley, the nature has very complex system and it is orderly. For example, human eyes is a very delicate camera. Has this very delicate system come into existence without any planning? He used the sciences of his time to confirm his view.

Mutahhari, a very eminent Iranian contemporary philosopher, believed that the study of nature leads us to the existence of an intelligent, knowledgeable and wise agent who runs the universe. But, does this prove that such agent is a self-existent one, not needing a creator? Science cannot prove this, but philosophy leads us to a creator who is self-sufficient. (5)

Criticisms of the design argument

The British philosopher David Hume (1711-1766) was the first philosopher who criticized the design argument. In his book «Dialogues Concerning Natural Religion», he

criticized the design argument on several grounds. (6) Hume's criticisms have been responded, and here we go over some of them. (7)

(a) Hume's first criticism: Comparison of a natural structure with a human made structure is not right. It is not right to compare the natural world with a human made structure. In the case human made devices, we have had frequent experiences that it is the result of our knowledge and thinking. But, in the case of natural phenomena we don't have such an experience. Our present world is the first natural structure that we are witnessing.

In response to this criticism, it is said that the design argument is not merely based on our sense experiences; rather, it is the intellect that by observing order in nature concludes that this would have not been possible without an intellect behind it. (8)

Because, there is a direct relation between an aimful order and the involvement of an intellect. It is the intellect that through thinking discovers this relation, and the denial of this relation is, in fact, the denial of an obvious fact. The concept of order and its recognition in nature is understood through intellect, and by its denial, there would be no difference between order and disorder.

(b) Hume's Second criticism: The order seen in nature is intrinsic to matter, i.e. the order is due to internal factors. Matter has some characteristics that gradually take it to maturity.

According to Hume, the order in nature is the outcome of an eternal chance. Matter gradually shows itself in

different configurations, and we are in a period that it shows an order, but we think this has been always the case.

In response to this criticism, theists have appealed to the probability calculus. For example, David Osselton (an American mathematician) has shown, through a calculation, that to obtain, through a computer having 50 letters, two lines of a Shakespeare poem, one has to strike 10150kiks on a keyboard, a number which is much larger than the number of atoms in the known world. (9)

(c) Third Criticism of Hume: Why can't we assume that a number of gods have given order to the nature, not a single god?

Hume claims that although the assumption of a single god is simpler than the assumption of several gods, but in the assumption of multiple gods, we are assuming beings similar to ourselves, which is more compatible with our assumption.

In response to Hume, a number of questions have been raised, including:

• It is against Occam's principle, which says that we should always accept the simplest explanation. In fact, there is no reason to assume that there have been several designers.

• There is no evidence that there has been several designers at work.

• If there were multiple gods, we would have expected different designs in the world, as we see different architectures in different cities.

• What caused the collaboration of the gods?

• These and similar questions are not asked in the case of

a single god. Furthermore, monotheism leads us to expect an ordered design in the whole world.

Hume believed that the design argument, at most, lead us to a superhuman, not an omnipotent God. In response to this claim, it is said that dissimilarity between effects is an indication of dissimilarity between their causes.

A contemporary criticism of the design argument is that it causes people to leave aside scientific searches: But, in fact, the enthusiasm for understanding God's signs was a motivation for scientific research, both during the Islamic civilization era and in the middle ages in the Christian World. As **Paul Davies** (an eminent contemporary physicist) said:

> *«It was from the intellectual ferment brought about by the merging of Greek philosophy and Judeo-Islamic-Christian thought that modern science emerged, with its unidirectional linear time, its insistence on nature's rationality, and its emphasis on mathematical principles. All the early scientists, like Newton, were religious in one way or another. They saw their science as a means of uncovering traces of God's handiwork in the universe. What we now call the laws of physics they regarded as God's abstract creation: thoughts, so to speak, in the mind of God.» (10)*

After renaissance, some scientists considered teleology as an obstacle against the search for the lawfulness of nature. But, today many scientists agree that teleological concepts don't delay the understanding of physics, chemistry, etc., and in fact, it leads to the analysis of the behavior of the whole system.

Darwin and the design argument

Darwin presented his theory of evolution in 1859. According to this theory, living creatures started from single cells and by gradual evolution they became more advanced, and at the latest stage human beings were developed. Darwin's theory involves a mechanism called natural selection, which involves irregular variations, struggle for survival and the survival of the most fitted. Natural selection is the principal agent that determines the direction of mechanical changes.

In Darwin's View, the order that we observe in the world of living creatures is not the result of a previous design, but is the result of a long – time accidental development. Since the presentation of Darwin's theory of evolution, some challenges have been presented against the design argument. According to Darwin, the presence of order necessitates the presence of designer, if we cannot interpret natural phenomena through material mechanisms. But, in Darwin's theory advanced species appeared through the development of simpler species, i. e., earlier grounds and the present condition, made the appearance of more advanced species more probable.

In response to Darwin's view, Muslim's philosophers have said: (11)

• Natural causes have a longitudinal relation with supra-natural causes; rather than a transversal relation.

• Science shows preparatory causes not the efficient cause.

• The clarification of the efficient cause does not make us needless of the final cause.

• The discovery of the efficient cause is not the job of science but belongs to the domain of philosophy, by which we can get access to some of the mysteries of the world. Furthermore, it is said that chance alone cannot clarify a development. Pierre du Nouy (a French biophysicist and philosopher) has calculated that the probability that a protein molecule to be made through chance is 1 in 10321. (12)

• It is also said that natural selection is not a creating force. It eliminates the unsuitable. But, it cannot justify the positive direction of an evolutional development.

Furthermore, in response to the hypothesis that everything is due to the evolution and nothing more is needed, we can say that evolution needs a world that admits the emergence of life and as we shall see this requires very delicate laws in nature. Then, it is obvious that an Omniscient and Omnipotent God can provide all necessary prerequisites. In the last several decades, some scholars have gone after finding evidences for design in the laws governing the evolution, rather than finding deficiencies in the theory of evolution.

Alternative forms of design argument

According to Mutahhari, an effect indicates not only the presence of its cause but also some characteristic of the cause, such as its knowledge. (13)

Swinburne, a well-known contemporary British philosopher, believes that we have two kinds of order: special and temporal. An example of the first is a city in which the streets are perpendicular to each other. The

temporal order is the behavior according to the laws of nature. (14)

Most of the eighteenth-century thinkers were believers in temporal order. The critics of this kind of order were saying that the complex animals and plants are the results of simple animals and plants, and these, in turn, are rooted in inorganic matter. These criticisms lead to the abandonment of the design argument. But, Swinburne went after temporal order, to avoid the Darwinian criticism. It is true that animals and plants are made of inorganic matter, but this has happened through some laws (chemical and biological). The order under his consideration is the governance of simple scientific laws. Usually, we explain phenomena in terms of laws, and we explain simple laws in terms of more general ones (e. g. Kepler's laws in terms of Newton›s laws). But, science itself cannot explain fundamental laws. Thus, we have either to stop justification, or consider these laws due to a knowledgeable and free agent. Swinburne leaves aside the explanation in terms of an agent with limited power. He concludes that the dissimilarity between human products and nature leads us to the dissimilarity between their causes. Thus, the presence of order in nature increases the probability of God›s existence.

Modern Design Argument

During the 12th century **Aquinas** pointed out that natural bodies behave in such a way that indicates they are directed towards a definite goal which yields the best results. This concordance of tools with goals indicates planning, and

since natural bodies lack consciousness, there should be an agent leading them to that direction:

> *«Some intelligent being exists by whom all natural things are directed to their end» (15)*

With the development of Newtonian mechanics, the argument of Aquinas lost its glow, because it was argued that Newton's laws explain the motion of bodies, without any need for a design. But, for many scientists, like Boylé, the attribution of nature's cohesion to chance was not digestible.

On the other hand, after Paley argued that the complex structure of the world is the result of God's design, Darwin's theory of evolution claimed that the complex structure of animals is due to chance, through the natural selection mechanism, and there is no need for a former designer. But, in the last several decades, design argument has taken a new form, in which one deals with the laws of nature, and avoids Darwinian criticisms. The Darwinian evolution is based on a selection from a collection of competing similar things, but in the case of physical laws and initial conditions of the universe, there is no collection of competing worlds, and the laws and initial conditions are unique. This, if the emergence of life requires specific physical laws and finely tuned initial conditions, then the existence of a designer is compulsory. Thus, while some scholars believed that the details of physical reality is determined through the Darwinian natural selection, **Barrow and Tippler** said:

> *«The sizes of bodies like stars, planets and even*

people are neither random nor the result of any progressive selection process, but simply manifestations of the different strength of the various forces of nature. They are examples of possible equilibrium state between competing forces of attraction and repulsion.» (16)

Bernard Carr and Martin Rees, too, pointed out that the possibility of life, as we know, depends on the value of several natural constants and is critically sensitive to them. (17)

As **Paul Davies** seems up:

«There is now broad agreement among physicists and cosmologists that the universe is in several respects 'fine-tuned' for life.» (18)

It is interesting that just at the time that scientists had become ready to put aside the design argument, it has returned to the scene, with much stronger evidences Although there are complex requirements for the emergence of Carbon-based life, the physical world shows appropriate grounds for its emergence. It seems that there is a very fine tuning between natural constants that leads to the emergence of life. This fine tuning needs explanation.

It was in 1974 that Brandon Carter presented his "Anthropic principle».

According to this principle, the physical structure of the world is such that it leads to the emergence of human life.(19). Since then, several versions of the anthropic principle have been presented.

Anthropic Principle and the design argument

As we mentioned a different reading of the design argument has become popular in the last several decades that avoids Darwinian criticisms.

The Darwinian evolution was based on selection between competing things and the present order we see in nature was considered to be the result of natural selection, without only reference to any designer. But in the case of physical laws and cosmological conditions, there is no competition and the laws and initial conditions are unique. Thus, if the emergence of life depends on specific physical laws and finely tuned initial conditions, the presence of a designer becomes relevant.

Studies have shown that the size of bodies like stars and planets and humans are not accidental and are not the result of natural selection, but is the result of the relative strength of the four natural forces. It seems that there has been an extra ordinary concordance between the constants of nature without which human beings would have not emerged. To account for this, Brandon Carter introduced his anthropic principle in 1974, which correlates the physical structure of the world with the requirements for the emergence of humans. (20)

Before the presentation of Copernicus' sun-centered universe, philosophers, both in the Islamic world and in the Christian World, had considered humans at center of the creation. Copernicus mentioned that we have not occupied a special place in the world. But, the anthropic principle returns the distinguished place of human beings in the world. Even

though the earth is not at the center of the world, this does not deny the significance of humans in the world. In fact, even though we are small creatures, but as far as complexity and capacity is concerned, we are the most significant creatures. In 1957, Robert Dicke, an eminent American cosmologist, published the results of his studies on the relation of biological factors with the relation of large numbers. Then, he reached the conclusion that the numerical value for the life of the universe is related with the conditions for the emergence of life.

Living systems on the earth depend on the chemical properties of carbon and its relation with the elements H, N, O, and P. These five elements have an important role in life. It turns out that for the production of these elements the universe should have gone through certain developments, and for these to happen there should be a very delicate balance between the forces of nature.

Before the twentieth century only two forces were known: gravitational and electromagnetic. But during the twentieth century two more forces became known: weak nuclear force and strong nuclear force. Now, if we represent the strength of these forces by the dimenlessionless constants αs (for strong force) , α (for electromagnetic force), αw (for weak force), and αg (for gravitational force), then the development of the universe depends on the relative strength of these four numbers.

One of the important fine tunings in nature is what Hoyle (an eminent British philosopher) showed. Consider the process

A+B+C

in which the nuclei A and B combine to produce the nucleus C. If the kinetic energy of A and B have such values that their combination

is exactly above one of the allowed energy levels of C, this process occurs abundantly. In 1953, Hoyle showed that there is such a level in the carbon nucleus but there is no such level in the Oxygen nucleus. So Carbon is produced abundantly, but Oxygen is not produced abundantly. If this was not the case in the Oxygen nucleus, all carbons would have turned nto Oxygen and higher nuclei and there would be no carbon left –something which is necessary for Carbon based life.

Now it can be shown that, if the strong nuclear force were a bit weaker than its present form, we would have only hydrogen in the world, and if it were a bit stronger all hydrogen would have turned into He, and in both cases, there would have not been any stable stars and water. Furthermore, for the emergence of life, the universe should have a lifetime of several billion years for the generation of heavy elements, but it could not be older than the present case; otherwise, it would have turned into matter between stars and we would not be here. Thus, the existence of carbon based organisms depends on a delicate balance between the four forces of nature.

Different Readings of the Anthropic Principles

We saw that if the strength of the four fundamental forces of nature were much different from their present value, the

necessary conditions for the emergence of Carbon-based life would have not been met, and we would not be here to ask why they have their present values. This has led to the Anthropic principle which has had different readings.

Week Anthropic Principle

According to this reading, our existence permits us to derive the value of the constants of nature, i. e. the world in which we live should have conditions that are consistent with our presence.

Strong Anthropic Principle

This reading says that the universe should have properties that permit the emergence of life at a certain level of its development. With this reading, not only we can get the value of these constants, but we have also an explanation for their present values.

This reading, in fact, introduces a teleological explanation into physics, which indicates that the universe has been planned to have the emergence of conscious human beings. Thus, those physicists that deny teleological considerations, don't accept this reading and are confined to the weak reading of the anthropic principle. The strongest argument for the strong anthropic principle is that, for the consistency of quantum mechanics, there should observers. But, this is not acceptable, because there are other interpretations of the standard quantum mechanics, which don't need observers. Furthermore, the standard quantum theory has neither a satisfactory

foundation, nor it is a completely consistent theory.

Different explanations for Anthropic Principles

Up to now, several physical explanations are suggested for the anthropic coincidences (fine tuning of fundamental physical constants) that we mention them.

(1) The Multiverse Idea

In 1957, Hugh Everett suggested that whenever an observation is made, the universe is divided into branches, each of which carries one of the possible values of the quantity under consideration. (21).

This idea has been taken to the cosmology, where they assume that we have a collection of parallel universes each of which carries different values for the constants of nature, and in a small fraction of these universes the value of the fundamental constant are such that they permit the emergence of life.

In a similar theory, it is assumed that what we see is a small part of an infinite system in space. If we could see beyond 10 billion light years, which is the limit of our present observations, we could possibly see universes different from our universe.

To the multiverse theory, there has been the following criticisms.

(a) Here it is assumed that there should be many (in fact infinite) universes, in order to explain the order of one universe. But this is against Occam's razor principle that one should not make more assumptions than the minimum needed. In the words of **Paul Davies**:

> *«Attempts to explain this ‹ too good to be true› arrangement by invoking an infinity of random universes require metaphysical assumptions at least as questionable as those of design.» (22)*

and

> *«Not everybody is happy with the many-universes theory. To postulate an infinity of unseen and unseeable universes just to explain the one we do see seems like a case of excess baggage carried to the extreme. It is simpler to postulate one unseen God.»(23)*

Metaphysically speaking, the assumption of an Omniscient Omnipotent God carries much less metaphysical load than the assumption of an infinite number of unseen and unseeable universe. As **Swinburne** (an eminent British philosopher) put it:

> *«To postulate a trillion trillion other universes, rather than one God in order to explain the orderliness of our universe, seems the height of irrationality. « (24)*

(b) The multiverse theory talks about other universes about which we can never get any information. Thus, scientifically speaking, this theory can never be refuted. As **Paul Davies** said:

> *«Scientifically the many-universes theory is unsatisfactory because it could never be falsified.: what discoveries would lead a many-worlder to change his/her mind? What can you say to convince somebody who denies the existence*

of these other worlds? Worse still, you can use many worlds to explain anything at all? Science becomes redundant.» (25)

(c) In a multiverse theory, there has to be a mechanism for the generation of universes. The theory of inflation provides a mechanism for the generation of universes. But the theory of inflation itself needs some fine tunings. In the words of **William Craig**:

«At the end of the day, it is important to realize that the inflationary Ansatz has failed to arrive at explanations that, even if accepted, are insensitive to highly special initial conditions. In other words, inflationary scenarios seem to require the same sort of fine-tuning that theorists had hoped these models had eliminated.» (26)

(d) This theory can explain only those aspects of the nature that deal with intelligent life. But, some samples of order, as seen in particle physics, have no relation with biology.

(e) There can also be a theistic interpretation of the multiverse. Because the Omnipotent God of monotheistic religions can create many universes, i. e. the existence of many universes is not inconsistent with the existence of a transcendental God. But as **Brian Green** (an American theoretical physicist and a string theorist) mentioned, even if there is a generator of multiverse, it needs a designer, as is the case of a a single world, if it is to lead to life. Then the fine tuning should be carried to the multiverse. (27) **Robin Collins** (an American philosopher) argues that

the generation of many universes, by a physical process, is very consistent with the monotheistic idea that God is infinitely creator:

> *«In this section, I will argue not only that theism is compatible with the universe-generator version of the multiverse hypothesis, but also that theists might even have reasons for preferring a multiverse over a single universe. Since within the world's theistic traditions, God is considered infinite and infinitely creative, it makes sense that creation would reflect these attributes, and hence that physical reality might be much larger than one universe. Further, it makes sense that an infinitely creative God might create these many universes via some sort of universe-generator; since arguably this would be somewhat more elegant and ingenious than just creating them ex nihilo.»(28)*

(2) An Oscillating Universe

According to this view, our universe is a closed one, undergoing frequent expansions and contractions. There is a possibility that in each period its fundament constants change. Thus, with an infinite number of oscillations, there is a possibility that in some periods life emerges. But, the oscillating universe has some problems of which we only mention two of them.

(a) The present evidence shows that we are in an open universe, i. e. the present expansion continues for ever.

(b) In every period of expansion and contraction, there is a net increase in the entropy of the universe. This

increase in entropy appears as an increase in the number of photons relative to other particles. Thus, after an infinite number of oscillations, the number of photons relative to nuclear particles should have become infinite. But, the actual number of photons at the present time is finite. Thus, the number of nuclear particles should be zero, and there should be no material world anymore; which is against the evidence. Thus, **Steven Weinberg** says:

> *"As far as we know, the universe would then start each new cycle with a new, especially larger ratio of photons to nuclear particles. Right now this ratio is large, but not infinite, so it is hard to see how the universe could have previously experienced an infinite number of cycles.» (29)*

Recently Penrose and Steinhart have presented some models of an oscillatory universe for which the aforementioned problems are not present. But, first of all these models are not settled yet. Secondly, the oscillatory universe is not against the creation of these universes by God, as some philosophers (such as Iranian philosopher Mutahheri) mentioned.

(3) Explanation in terms of a deeper theory

Some physicists have suggested that a deeper theory can explain the present value of the fundamental constants of nature. In the words of **Brandon Carter**:

> *"I would personally be happier with explanations of the values of the fundamental coupling constants etc. based on a deeper mathematical structure (in which they would no longer be fundamental but*

would be derived).»(30)

In the view of these people, we have already had coincidences in science that were explained later. But:

(a) Why is that deeper theory that predicts the emergence of life is actually ruling, and not another one?

(b) It is an extreme case of reductionism to assume that all events are predictable from a fundamental principle. This is, in fact, a denial of the emergence of new phenomena at higher levels of order. Perhaps Shakespeare poems could not develop without the ruling of the super symmetry. But, they are not predictable from the super symmetry principle.

Furthermore, even if we know the laws of nature, their solutions are many. We know from the particle physics that the solutions of the equations don't necessarily carry the symmetry of those equations.

(c) The most important criticism of explaining the fine tuning of constants of nature through a deeper theory, is that it violates Gödel›s incompleteness theorem. According to this theorem, any theory that involves the principles of arithmetic is incomplete (i.e. we cannot show its consistency); i. e. in any system which includes arithmetic, we have to choose between consistency and completeness. Now, in science we always have emphasis on consistency. Thus, Gödel›s theorem denies the "theory of everything". Therefore, we should not expect that fine turning be explainable in terms of a theory of everything. Furthermore, even it a deeper theory explains the fine tuning of the fundamental constants of nature, we expect

on the basis of Gödel›s theorem to have other problems not explainable by that theory.

(4) The existence of a designer

In this view, the fine tuning that we observe in nature is due to a designer, i.e. the initial conditions and the rules governing the world are such that they lead to the emergence of intelligent life. This means that intelligent life is what an Omniscient Omnipotent God could produce, and He had enough reasons for it. In the words of **George Ellis**:

> *"Does the idea of a multiverse precludes the monotheistic idea of a creator God? I argue that the answer is no...the ideas can exist together. God could have chosen to operate via creation of multiverses. The multiverse proposal says nothing about ultimate causation (chance, probability, design): All the same anthropic issues arise as for a single universe: Why this multiverse and not another one?" (31)*

Some physicists, like Hoyle and Davies see the world under the control of a super intellect, but their god is not the God of monotheistic religions; it is merely the universe and its rules. In the words of **Robert Naumann** (American physicist):

> *«I hold that God is the totality of the Universe, this includes all scientific principles, all matter and energy, and all life-forms. The existence of the universe requires me to conclude that God exists.» (32)*

Finally, to argue from the fine tuning of the constants of

nature to the existence of God, we have to go beyond physics and use a metaphysics. This is what Muslim philosophers did for the old style of design argument. However, anthropic considerations indicate that our universe is much richer than empirical science can deal with, and anthropic considerations should be used as a premise for a philosophical argument.

Conclusion

In summing up our discussion about the anthropic principle, we conclude, in the company of **George F. Ellis**, (33):

(a) In the comparison of the various explanations about fine tuning of the constants of nature, it is difficult to avoid the conclusion that the idea of a designer is the most convincing one. But, we have to expand our considerations so that other dimensions of human experience is taken into account, experiences like fears and wishes, loves, beauties, ethical values, etc. Then, we can say that the emergence of human beings having intelligence, values and being ready to ascend high spiritual levels has been in God's consideration.

(b) Those who deny the aforementioned view, but claim that they are after an inclusive explanation about the universe, should present a new cosmology that can explain all human experiences, and not being confined to only those things that science can accommodate. At our present time, we have no sign of such a theory.

Sources

(1) Subhani, J›far, Kalam Journal (in Persian), Vol. 3, No. 1, 1981, p. 21.

(2) Hoyle, Fred, «The Universe: Past and Present Reflections", Ann. Rev. Astron. Astrophys, 1982, Vol. 20, p. 16.

(3) Mutahhari, Mortaza, Collected Works (in Persian), Vol. 4 (Tehran: Sadra Publications, 1995), pp. 70-71

(4) Barbour, Ian, Religion and Science (HarperSanFrancisco, 1990), p.51.

(5) Mutahhari, Mortaza, Collected Works (in Persian), Vol. 1 (Tehran: Sadra Publications, !995), p. 550.

(6) Hume, David, Dialogues Concerning Natural Religion (Hackett Classics, 1998).

(7) Mutahhari, Mortaza, Collected Works (in Persian), Vol. 8 (Tehran: Sadra Publications, !995), pp. 453-486.

(8) Ibid., pp. 470-471.

(9) New Scientist, No. 1428(1984), p.39.

10) Paul Davies, «Physics and the Mind of God: The Templeton Prize Address", First Things, 55, August/September 1995, p. 32.

(11) Mutahhari, Mortaza, Collected Works (in Persian), Vol. 4, pp. 86-87 and 209-217.

(12) Barbour, Ian, Issues in Science and Religion (London: Prentice Hall International Co., 1966), p.387

13) Mutahhari, Mortaza, Monotheism - in Persian (Tehran: Sadra Publications, 2008), pp. 55-56.

(14) Swinburne, Richard, Argument from Design, Philosophy 43 (165), 1968, pp.199-212.

(15) Aquinas, Thomas, Summa Theologica, Article 3, Question 2.

(16) Barrow, John and Tippler, Frank, The Anthropic Cosmological Principle (Oxford: Clarendon Press, 1986), p.288.

(17) Peters, Ted, Cosmos as Creation (Abingdon Press, 1989), p.130.

(18) Davies, Paul, «How bio-friendly is the universe?» International Journal of Astrobiology, Vol. 2, no. 2 (2003), p. 115.

(19) Carter, Brandon, «Large number coincidences and the anthropic principle in cosmology,» in Confrontation of Cosmological Theories with

Observation, M. S. Longair, ed. (D. Reidel Publishing Company, 1974).
(20) Carter, B., in Confrontation of Cosmological Theories with Observation, ed. M.S. Longair (Dordrecht: Reidel, 1974), p. 291.
(21) Everett, H., Relative state formulation of quantum mechanics, Rev. Mod. Phys., 29, pp.454-462 (1957).
(22) Paul Davies, in Evidence of Purpose, ed. J.M. Templeton (New York: Continuum, 1994), p. 56.
(23) Davies, Paul, The Mind of God (New York: Touchstone, 1993), p. 190.
(24) Swinburne, Richard, There Is A God (Oxford: Oxford University Press, 1996), p. 68.
(25). Davies, Paul, The Mind of God, P. 190.
(26). Craig, Willam Lane, « Design and the Anthropic Fine Tuning of the Universe», in God and Design, ed. by Nail A. Manson (London: Routledge, 2003), p. 160.
(27) Brian Green, The Hidden Reality: Parallel Universes and the Deep Laws of the Cosmos (London: Penguin,2011),P. 128.
(28) Bernard Carr, Universe or Multiverse, p. 460.
(29) Weinberg, Steven, The First Three Minutes (Basic Books, 199, p. 154.
(30) Leslie, John, ed., Modern Cosmology and Philosophy (New York: Prometheus Books, 1998), P. 139.
(31). Ellis, George, "The Multiverse, Ultimate Causation and God", https://www.faraday.st-edmunds.cam.ac.uk/resources/George%20Ellis%20Lecture/Ellis-Faraday.pdf
(32) Margenau, Henry and Varghese, Roy Abraham, Cosmos, Bios Theos (La Salle, Illinoise: Open Court, 19930, p.72.
(33) George Ellis, Before the Beginning (London: Boyars/Bowerdean, 1993), pp. 127-28.

| CHAPTER EIGHT |

MIRACLES

Introduction

One of the characteristics of the monotheistic religions is that they involve miracles. This is a problem for which materialistic schools criticize theistic religions. Because, in their view miracles break the laws of nature. In the view of some other scholars, a miracle is an event without a cause. The scientists of the 17th century had two commitments:

- Science is based on constant laws.
- God occasionally interferes in the natural order, and breaks a law of nature.

In U.K. some scientists, like Robert Boyle, were defending miracles. In their view miracles occur and they are fortifying the belief in Christianity.

Definition of a miracle

In the Qur'an, the word 'ayat' is used to refer to some sign of God that is supporting a prophet's claims, and indicates his relation with higher worlds, i.e. it indicates that it is a non-human hand that is apparently breaking a law of nature. In **Imam Sadiq's** words:

> *"Miracle is a sign of God, given only to his prophets, in order to differentiate those who have*

real connection with God from liars." (1)

Mutahhari, an eminent contemporary Iranian philosopher, defends the occurrence of miracles in the following form:

> *"Miracle is a challenging act of a prophet to prove his claim, and is an indication that a supra-human power is at work, and in general it is beyond human power:" (2)*

In the West, **St. Augustine** was the first one to present a formal definition for a miracle. In a letter to a friend, he wrote that:

> *«[A miracle is] anything which appears arduous or unusual, beyond expectation or ability of the one who marvels at it. « (3)*

In **Augustine›s** view, a miracle is not contrary to nature; rather, it is contrary to our knowledge about nature:

> *«Miracles do not happen in contradiction to nature, but only in contradiction to that which is known to us of nature.»(4)*

Thomas Aquinas defines miracle in the following way:

> *"[Miracles are events that] "God produces outside the usual order established in the creation". (5)*

Hume's definition of miracle is:

> *"A transgression of a law of nature by particular volition of the Deity, or by the interposition of some invisible agent". (6)*

Some scholars consider a miracle to be an event that its occurrence is contrary to the known laws of nature. As

Neville Mott (a Nobel Laureate in physics) says:

> *«By a miracle I mean an act of God in which natural law is broken.»(7)*

Different Positions Regarding Miracles

(a) Defenders of miracles

Some people consider miracles as an indication of the breaking the laws of nature, and since they have belief in known causes, they consider a miracle to be an indication of the breaking the principle of causality.

Many eminent scientists, like Galileo, Kepler, Newton, Faraday, and Maxwell believed in the occurrence of miracles. **Richard Bube** (a Stanford University Professor) believes that science has proved that miracles are impossible. But, in fact, miracles are unique historical events. So, science cannot say anything about them. The only just judgment is that miracles are not expected. But this is, in fact, the nature of a miracle, and is hardly an argument against it. (9)

(b) The hermeneutics position

Some Muslim scholars appeal to a hermeneutic position regarding the Qur'anic verses that deal with miracles. For example, they say: Moses was a clever man. He had learned about tides from the scholars of his time and could calculate the time of their occurrences. Thus, he chose a suitable time for passing the see. The pioneer in this kind of thinking was Sir Seyyed Ahmad Khan of India. He thought that all of the miracles mentioned in the Qur'an could be explained in a natural way. He presented the following arguments to support his view: (10)

• There are verses in the Qur'an in which people have asked their prophets and they responded that they are only a human being.

• There are verses in the Qur'an that talk about non-breakable laws of God.

He challenges those who stick to some specific cases in the Qur'an dealing with abnormal events to prove that the verses under consideration cannot have other interpretations.

Spinoza believed that miracles are impossible. So, the matters dealing with miracles in the Sacred books should not be read superficially. (11)

(c) Asharites and some Christian Theologians

These people do not differentiate between miracles and other events. In fact, they consider all happenings as miracles, i.e. the acts of God. The Qur'an refers to all that happens as signs of God. The laws that we are dealing with in science are the laws devised by God himself, and he can breaks them any time He wants. If we talk about definite laws, we have, in fact, limited God's power. Asharite theologians considered the known laws as the habit of God, that usually happens. Our intellect never discovers the necessity of the laws of nature, we only discover them. Prophets' miracles are against the natural laws that human beings have discovered. As **Augustine** said

> *«Those things are properly called miracles which are done by divine agency beyond the order commonly observed in nature.» (12)*

Robert Boyle supports this position:

> *"While God established laws of nature], « yet he has not bound up his own hands by them, but can invigorate, suspend, overrule and reverse any of them as he thinks fit.» (13)*

And so is **Richard Bube** (An American scientist):

> *«If it is realized that the biblical view is that the very existence of the world from moment to moment depends upon the creative and sustaining power of God, that no natural law has any power of its own to continue (i.e. physical laws are descriptive and not prescriptive), and that no ‹expected› circumstance has any ability to bring itself into being, we come to the conclusion that God›s activity in a miracle is not qualitatively different from God›s activity in natural phenomena.» (14)*

Bube considers miracles as witnesses to God's free activity for making know himself. (15)

Sheik Muhammad Muqniah, an eminent Lebaneze scholar, said:

> *"Natural causes are effective, if God wants, but when he doesn't want the effect necessarily is not there." (16)*

In short, these people believe that our world was created by God from nothing, and it needs God for existence continuously. He has give certain properties to natural things and they usually work according to them, but God can change it, as he is the owner of nature.

(d) Believers in unknown causes (material or immaterial)

They believe that in a miracle there are some causes at work that we don't know. But in details, there are different views.

Some scholars believe that prophet's miracles were due to the knowledge given to them by God. They were aware of some laws which were not known by others at that time. Harrison believes that Newton and his followers believed in miracles, but didn't consider it as the breaking of the laws of nature. (17). In view of Peter **Hodgson** (a British nuclear physicist):

> *«There may possibly be forces in nature that we do not yet understand, but if so then they will behave regularly and will be brought up within the area of scientific knowledge.» (18)*

In short, these people don't consider miracles as the denial of the causality principle, but consider miracles as indications of other laws besides the known laws at the time. In their view, the cause could be immaterial. The recognition of the cause of some event is through science. But, science cannot show that an event **"B"** cannot happen save through **"A"**. In fact, experience can never prove the impossibility of something. That can only come through philosophical argument. Thus, miracle is an indication of a cause beyond the known causes. **Tabatabaei**, a well-known contemporary Iranian philosopher, believed that the Qur'an confirms the law of causality, but it could happen that what we know as the cause of something, is not the real cause:

> *"Any natural effect has a natural cause. But we*

can›t confine natural causes to the ones known to us." (19)

Mutahhari, too, believed that miracles are not breaking the laws of nature but are indications of the cancellation the effects of a law through another law. (20)

Thus, no miracle happens outside the real laws of nature. In short, we cannot say that the natural cause for an event is restricted to what we have known. Furthermore, the working of non-material causes for natural events is not contrary to the causality principle. No scientific law can deny this. Scientific laws can only say that in their domain certain relations exist. But, they cannot claim that there is nothing beyond them. It could be that for the occurrence of an event there are two ways, but we only know one of them. Prophets get knowledge of other ways and cause the occurrence of some events. It is also possible that for the occurrence of a phenomenon there could immaterial causes (e.g. angels).

The Effect of Souls

Some philosophers believe that there are other faculties in human beings, besides the known ones, that are interpreted as spiritual. These faculties have effects on human beings. Those who go through self-discipline own some specific spiritual states, through which can cause events that could not happen through natural causes. This means that there could be some non-material causes for natural phenomena, e.g. the spirit of a prophet or a saint. The spiritual abilities exist in human beings and can affect

their body. For example, the spirit of a person can affect his body so that he would not need food. Besides, there could be non-material worlds, besides the material ones. The human spirit, through connection to non-material worlds can get extra-ordinary powers so that he could not only affect his own body, but can affect the body of others. In the Qur'an and Islamic tradition, there is talk about another world called **Malacout**. Through connection to this world, prophet's spirit can get so much power that he could affect the world, and do miraculous things.

Thus, some phenomena could happen through a prophet's spirit. Sometimes, we see some ascetics that can do things through spiritual self-discipline that ordinary people cannot do. In the words of **Avecinna**:

> *"If you see a mystic that abstains from eating, for an extra-ordinary period, be gentle in accepting it and consider it as a known principle of nature ... It could happen that food could be cut from somebody and he continues his life, where as if it is cut in some[other] state, he would die." (21)*

And he adds:

> *«If you hear that a mystic did something or had a motion that others could not have, do not deny it. It is possible that you could find its cause in the natural laws.» (22)*

Thus, the difference of miracles with other phenomena is merely from our point of view, not from the view of a person who is completely aware of the causes of all phenomena of nature.

In short, As **Ayatullah Subhani**, an eminent shia scholar, has mentioned, (23) there are three causes for prophets' miracles.

- Unknown natural causes.
- The effect of the spirit of prophets
- Immaterial causes, like angels, who are God's agents for the management of the world.

Sources

(1) Mutahhari, Mortaza, Mutahhari›s Collectd Works, Vol. 4 (Tehran: Sadra Publications, 1995), p. 430.

(2) Majlesi, Muhammad Baghir, Behar al-Anwar, Vol. 11 (Beirut: Mu›assasat al-Wafa,1403 H. Q), p.71.

(3) Harrison, Peter, « Newtonian Science, Miracles and the Laws of Nature», Journal of the History of Ideas, 56(4), p.533.

(4) Ibid.

(5) Aguti, Andrea, « Are miracles violations of the Laws of Nature», Religious Inquiries,Vol. 5 , No. 10 Dec. 2016, p.20.

(6) Ibid.

(7)Mott,SirNeville,CanScientistsBelieve(London:James&James,1991p.3.

(8) Hume, David, A Treatise of Human Nature, ed. by L.A. Selby-Bigge and P. H. Nidditch (Oxford, 1975) pp.114-115.

(9) Sir Neville Mott, p. 116.

(10) Seyyed Ahmad Khan Hendi, Tasir al-Qur›an wa Hova al-Hoda wa al-Furqan, trans. by N.T. Daei (Ilmi Publications, 1953), pp. 12-14

(11) Peter Harrison. (1995) «Newtonian Science, Miracles, and the Laws of Nature"; http://epublications.bond.edu.au/hss_pubs/55, p. 543.

(12) Quoted in Cambridge Companion to Miracles, ed. by Graham H. Twelftree (Cambridge University Press, 2011), p. 291.

(13) Harrison, Peter, p. 535.

(14) Mott, Sir Neville, pp. 116-117.

(15) Ibid, p. 117.

(16) Muqniah, Muhammad Javad , Falsafat Islamiyah (Dar al-Kitab Islami, 1385 H. Q.) , p. 496.

(17) Harrison, Peter, p. 545.

(18) Mott, Sir Neville, p. 74.

(19) Tabatabaei, Seyyed Muhammad Husein, Collection of Articles, Questions and Responses (Daftar Nashr Islami, 2003), p. 298.

(20) Mutahhari, Mortaza, Mutahhari›s Collectd Works, Vol. 4, p. 447.

(21) Malekshahi, Hasan, Translation and explanation of Avecinna›s Isharat wa Tanbihat , Vol. 1 (Tehran Soroush Publications, 1997) , pp461-462.

(22) Ibid., p. 465.

(23) Subhani, Jafar, Ilahiyat wa Maaref Islami (Qum: Moassesah Imam Sadegh, 2003), p. 202.

| CHAPTER NINE |

THE PROBLEM OF EVIL IN THE WORLD

Introduction

We clearly see pain, death, cruelty, and natural disasters (like flood and fire). Where do these evils come from? The problem of evil and its varieties (natural, super natural and moral) is an old one, and it has been one of the tools that atheists have used against theism. But in recent times it has become used more and more by atheist scientists and philosophers against the belief in God. They argue that the existence of evil is not compatible with God's Justice and Wisdom. On the other hand, the followers of monotheistic religions and theist philosophers believe in the Omniscience, Omnipotence and absolute wisdom of God. Thus, they should have a justification for the existence of evils.

The early history of evil in the West

Discussion about evil is present in the works of Socrates, Plato and Aristotle and became more serious with Plotinus. In the Christian world, St. Augustine and St. Thomas Aquinas paid attention to it. During the seventeenth century, Leibnitz paid special attention to it and wrote a treatise entitled, "Theodicy". During the eighteenth century

Hume and Voltaire paid attention to it and considered it unjustifiable. But during the nineteenth century William James presented a theory to justify it. During our era some Christian philosophers have paid special attention to it. In the Islamic World, theologians were the first group who paid attention to it. Muslim philosophers, too, have discussed about it in detail. We shall go over their views in brief.

Kinds of Evil

Philosophers and theologians have mentioned various classifications for evils, among which the following are the most common ones.

(a) Moral evils (robbery, murder, ...)

(b) Natural evils (deaths resulting from flood, fire, ...)

(c) Discriminations, hardships, etc.

Various views about evils

(1) Materialists have used evils as an argument against God's existence. They see evils against God's justice. In their view an Omnipotent God could have prevented the occurrence of evils. In the words of **Hume**:

> *"Epicurus' old questions are yet unanswered. Is he willing to prevent evil, but not able? then is he impotent. Is he able, but not willing? then is he malevolent. Is he both able and willing? Whence then is evil?» (1)*

John Mackie, a contemporary British philosopher, uses the existence of evils to deny the existence of God. His

argument goes as follows. In the world we are witnessing evils. But, an Omnipotent Omniscient, God could have prevented the occurrence of evils. Thus; either the Omnipotent, Omniscient God is not Benevolent or there is no God. In his view, theist encounter a contradiction in this problem:

> *"In its simplest form the problem is this: God is omnipotent; God is wholly good; and yet evil exists. There seems to be some contradiction between these three propositions, so that if any two of them were true the third would be false. But at the same time all three are essential parts of most theological positions: the theologian, it seems, at once must adhere and cannot consistently adhere to all three.» (2)*

(2) Some scientists and philosophers admit the presence of evils, but they have some explanations for them. Here, we mention some of the views.

(a) Some philosophers see the existence of evils necessary, as they are a ground for the occurrence of good results. They consider five possibilities for the creatures of this world:

- A creature which is absolutely good.
- A creature with more goodness than evil.
- A creature, with equal goodness and evil.
- A creature with more evil than goodness.
- A creature which is absolutely evil.

The occurrence of the last three types is against God's wisdom and the neglect of the second type, is an evil act.

An example of this kind is the case of natural beings for whom the access to a perfection is possible through a minor evil.

Avecinna (3) and Mulla-Sadra (4), two eminent Muslim philosophers, have used this classification to account for the existence of minor evils. The followers of their school believe that all evils finally lead to higher goods.

They mention some benefits of evils:

• Disasters and tragedies sometimes orient people towards God and purify their souls.

• In confronting disasters and tragedies, people become more curious and use their minds more often, and this can lead them to higher opportunities.

• Disasters and tragedies make people more tolerant in confronting accidents.

• Death would be an evil, if it were the end of human life. But if life is not the end of human history, death is not an evil.

(b) Some philosophers believe that we cannot really understand reasons behind the occurrence of evils. Our knowledge about the world is incomplete only God knows the whole affairs. In **Plantinga's** words:

> *"Why suppose that if God does have a good reason for permitting evil, the theist would be the first to know? Perhaps God has a good reason, but that reason is too complicated for us to understand. Or perhaps He has not revealed it for some other reason. The fact that the theist doesn›t know why God permits evil is, perhaps, an interesting fact about the theist, but by itself it shows little or nothing relevant to the rationality*

of belief in God.» (5)

In other words, in Plantinga's view, God's design of the universe could be beyond our rationality. As God's knowledge is complete and our knowledge of the world is incomplete, we may not understand reasons concerning the occurrence of some events.

(c) Some people have correlated the existence of moral evils to human's free will, and consider it necessary for human choice. It is the misuse of human freedom that leads to evil.

(d) In whitehead's theology, evils are explained through the denial of absolute power for God.

(e) In Zoroastrian religion, in order to avoid the problem of evil, they believe in dualism, i.e. they consider the Satan as the origin of evil.

(f) Muslim philosophers see evil's source in the essence of creatures, and see the existence, given by God, as the source of goodness.

In their view, what is given by God is existence and essences are the source of evil. (6)

Most of Muslim philosophers consider evils as being relative, i.e., they refer them to inabilities. (7) But, some of them consider evils as the sources of goodness. In fact, some evils are preliminaries for a forthcoming goodness, e.g. awakening humans. In any case, evils are minor relative to goodness, and neglecting them is an evil.

Suhrawardi, one the eminent Muslim philosophers, says:

"Evil in this world is much less than good." (8)

and also:

"Leaving great good for the safe of little evil, is a great evil." (9)

This attitude about great good and little evil can be deduced from the Qur'an itself. In the problem of the creation of human beings, when the angles asked God: why he creates creatures that generate immorality, God said: I know what you don't know. This means that good behaviors of human beings suppresses their evil acts.

Another point is that Muslim philosophers consider contrariety as the cause of movement, and movement as the cause of development. But, movement requires friction, and this sometimes requires evil. So, **Mulla Sadra** says:

"If there were no contrariety, no phenomenon would happen." (10)

In the view of Mulla – Sadra, it is the confrontation of good and evil that prepares the ground for all creatures. (11)

There are, also, people who believe that there is no absolute evil in the world and all evils are relative.

Some people have said that without suffering and pain we would not understand happiness, and it is in the sickness that human beings understand the value of health.

Swinburne, an eminent contemporary British philosopher, believes that evils are consistent with the existence of an Omnipotent, Omniscient and Benevolent God. Because, those evils which are permitted by God are the prologues of good. (12)

As far as moral evils are concerned, Swinburne, believes that we are free creatures and can choose freely and with

responsibility. Thus, moral evils are due to our having freedom of choice. (13) About the natural evils, Swinburne believes that they are the cause of some goods. (14) In short, both theist Muslim and Western philosophers consider evils as introduction for the generation of some goods, and that evils are minor relative to the goods in the whole universe. Furthermore, they consider this world, with some evils, better than a world without evils.

Sources

(1) Hume, David, Dialogues Concerning Natural Religion (Cambridge University Press, 2007), P.74.

(2) Mackie, J. L., «Evil and Omnipotence,» Mind, New Series, Vol. 64, No. 254. (Apr., 1955), p. 200.

(3) Avecinna, Al-Isharat wa›l-tanbihat (Beirut: Mu›assassah Al Nu›man , 1992), pp. 299-305.

(4) Mulla Sadra (Sadr al-Din Shirazi), Sadr al-Din Shirazi,Al-Hikma al-muta›aliya fi al-asfar al-›aqliyya al-arbàa , Vol. 7 (Dar Ihya al-Turath al-Arabi, 1990), p.68.

(5) Plantinga, Alvin, God, Freedom and Evil (William B. Eerdman Publishing Co., 1974), p. 10.

(6) Mulla Sadra (Sadr al-Din Shirazi)), Sadr al-Din Shirazi,Al-Hikma al-muta›aliya fi l-asfar al-›aqliyya al-arbàa (Dar Ihya al-Turath al-Arabi, 1990), p.353.

(7) Avecinna, Al-Ilahiyat min al-Shifa (Qum Daftar Tablighat Islami,1997). p.451.

(8) Suhrawardi, Suhrawardi›s Collected Works, Vol. 3, ed. by S. H. Nasr (Tehran: Institute for Humanities and Cultural Studies,1993) p. 557.

(9) Suhrawardi, Suhrawardi›s Collected Works, Vol. 4, ed. by S. H. Nasr (Tehran: Institute for Humanities and Cultural Studies,2001) p. 235.

(10) Mulla Sadra (Sadr al-Din Shirazi), Sadr al-Din Shirazi, Al-Hikma al-muta›aliya fi l-asfar al-›aqliyya al-arbàa, Vol. 7 (Beirut:Dar Ihya al-Turath al-Arabi, 1990), p. 77.

(11) Mulla Sadra (Sadr al-Din Shirazi), Al-Hikma al-muta›aliya fi l-asfar al-›aqliyya al-arbàa, Vol. 3 (Tehran: Bonyad Hikmat Sadra, 2002), p.117.

(12) Swinburne, Richard, "Theodicy, our Wellbeing, and God's rights ", International Journal for the Philosophy of Religion ,38 (1-3):75 - 91 (1995)

(13) Swinburne, Richard, Is there a God (Oxford: Oxford University Press, 1996), p. 98.

(14) Ibid., pp.107-113

| CHAPTER TEN |

PURPOSEFULNESS OF THE WORLD

has differentiated between creation and guidance. (1) This directionality is a mysterious aspect in everything, which directs it along the lines assigned by God. This includes the care of human beings, animals, plants, and inanimate objects:

- For human beings:

> *"By the soul and Him who fashioned it, and inspired it with its virtues and vices." (Al-Shams/7,8)*

- About animals:

"And [your Lord] inspired the bee [saying]: 'Make your home in the mountains and on the trees and the trellises that they erect. Then eat from every [kind of] fruit and follow meekly the ways of your Lord.'" (Al-Nahl/68-69)

- For Plants:

> *"and the herb and the tree prostrate [To Allah]" (Al-Rahman/6)*

- For Inanimate objects:

> *"and He revealed in each heaven its ordinance." (Fussilat/12)*

Thus, every created being receives some kind of direction, after its creation. It is like the case of a car which has its physical design, but needs somebody to direct it. This kind of directionality is evident in human beings and we can adapt it to instinct in animals.

In the Bohmian quantum mechanics, electron's have a wave function which is interpreted as the mental part of the electron. It is the informational part of the electron

and determines its destiny. In **Bohm's** view the ability for response may be similar to consciousness.

> *«The electron, in so far as it responds to a meaning in its environment, is observing the environment. It is doing exactly what human beings are doing.» (2)*

According to the Qur'an, everything in the world praises God, but we don't grasp their praise:

> *"There is not a thing but celebrates His praise, but you do not understand their glorification." (Al-Isra›/44)*

Mowlavi has put this verse into poetry:

> *"All particles of the world tell you hiddenly at night and daywe are hearing seeing and aware, but we are silent to you non-confidants."*

According to the Qur'an we are coming from God and return to him, and the creation of everything is for worshipping him in a proper way:

> *"I did not create the Jinn and the humans except that they may worship Me" (Al-Dhariyat/56)*

If we assume a purpose for the creation, then the development of the created beings is not without an end. In the Qur'anic view, this world terminates in the hereafter, where everything reaches the destiny suitable for it. If there were no hereafter, the creation would be futile. It may be said that hereafter is only meaningful for humans and possibly animals. Thus, a universal kind of purposefulness is disputable. In response to this challenge,

it is said:

• It is simplicity that on the basis of our present knowledge about the world, we deny purposefulness for non-humans.

• The discovery of anthropic fine-tunings is an indication of the special status of humans in the world. In the world of **Paul Davies**:

> *«The success of human science and mathematics and the anthropic fine tuning that is apparently a prerequisite for the very existence of humanlike beings, strongly suggests that our existence is linked into the laws of the universe at the most basic level. Far from being a trivial and incidental byproduct of random and meaningless physical processes, it seems that conscious organisms are a fundamental feature of the cosmos...the emergence somewhere, sometime in the universe of intelligent organisms capable of reflecting on the significance of the cosmos is, I believe written into the laws of nature. Clearly the universe could have been otherwise. The fact that it is as it is, and that its form is linked so intimately with our own existence, is powerful evidence that the universe exists for our purpose, and that in our small yet significant way, we are part of that purpose.» (3)*

In Short, on the basis of the Qur'an's explicit emphasis on the existence of the purpose for the created world, Muslim theologians and philosophers have never neglected teleological considerations, and have not been affected by modern science's neglect of teleological considerations. But modern science's neglect of teleology has affected

some Muslim scientists.

Teleology had an important role in science during the middle ages. For the scientists of that period every created being has a location in the hierarchy of the creation, as it created by a God Who had a goal for the world. During the 12th century, **Aquinas** pointed out that all natural beings act in such a way that indicates a directionality. Now, although natural things seem to lack consciousness, but there is a being, called God, that directs all natural things to their goal. (4)

In the beginning of modern science, too, some scientists believed in the purposefulness of the world. For example, Boyle wrote a book entitled: "The wisdom of God manifested in the works of creation", and he arranged an annual lectureship in order to defend religion against indifferentism and atheism. (5)

Nevertheless, most of the founders of modern science neglected teleology. Of course, they did not deny the existence of a purpose for this world, but they believed that teleological considerations should not have a role in science. But, the neglect of teleological considerations during the last two centuries has been partly due to the occupation of scientists with mathematical or experimental activities, and partly due to the wrong assumption that teleological considerations delay the advancement of science.

With the development of modern science and the ruling of a secular mentality and the prevalence of positivistic thinking, teleology was considered as a door to theism. Thus, atheists insisted on denying any teleological

consideration and denied explicitly any purpose for the world. As **Peter Atkins** (a note of physical chemist) puts it:

> *«A gross contamination of the reductionist ethics is the concept of purpose. All events at the molecular level that lies beneath all our actions, activities, and reflections are purposeless, and are accounted for by the collapse of energy and matter into ever -increasing disorder.» (6)*

and **Richard Dawkins** says:

> *«Natural selection, the blind, unconscious, automatic process which Darwin discovered, and which we now know is the explanation for the existence and apparently purposeful form of all life, has no purpose in mind. It has no mind and no minds eye. It does not plan for the future. It has no vision, no foresight, no sight at all. If it can be said to play the role of watchmaker in nature, it is the blind watchmaker.» (7)*

In response to Atkins, **Paul Davies** says:

> *«This argument assumes that entropy alone is an appropriate indicator of cosmic change. The decision to focus on this quantity is a purely ideological one. Russell and Atkins select entropy as the physical property for discussion because it paints a bleak picture of a degenerating, indeed doomed, universe. But there are other ways to describe cosmic evolution. There is good astronomical evidence that the universe began in a state of almost total blandness. The richness and diversity of physical*

systems we observe today have emerged through a long and complicated series of self-organising and self-complexifying processes. Viewed this way, the conspicuous story of the universe so far is one of unfolding enrichment, not decay. There is nothing within science as such to compel one to favour entropy over organised complexity in characterising the evolution of the universe. Second, it is obviously wrong to claim that a system with a finite life span cannot have a point. Individual human lives and cultures are subject to the same strictures of the second law of thermodynamics, and are finite as a result. Yet human beings and society have all sorts of goals and purposes. To say there is no point to human life because we each will one day die is clearly ridiculous. So, the fact that the stars may not burn forever, or the entire universe may eventually approach a state of thermodynamic equilibrium (or even dark emptiness) has little bearing on whether or not the universe has a point. « (8)

In denying the presence of purpose in the world, **Richard Dawkins** says:

«The universe we observe has precisely the properties we should expect if there is, at bottom, no design, no purpose, no evil and no good, nothing but blind, pitiless indifference. « (9)

This indicates that Dawkins takes naturalism for granted, i.e. there is nothing beyond our observations. Dawkins claims that evidences of evolution indicate a world without

any design. But, it is only by assuming naturalism that he can reach such a conclusion. Besides, if everything is reducible to physics, then as Nancy Murphy has indicated physical laws determine what humans are doing, i.e., humans› free will is only an illusion. (10)

Furthermore, can one conclude only from the data obtained from chemistry or molecular biology, at the level of atoms and molecules, that there is no purpose for the world? The answer is negative, because this conclusion is not a direct inference from science; rather, it is rooted in the metaphysical assumptions of scientists. In fact, it is a jump from an epistemological finding to an ontological conclusion, i. e. from not finding something, jumping to its non existence.

Weinberg (an eminent Nobel Laureate in physics) says:

> *«It is very hard to realize that this all is just a tiny part of an overwhelmingly hostile universe. It is even harder to realize that this present universe has evolved from an unspeakably unfamiliar early condition, and faces a future extinction of endless cold or intolerable heat. The more the universe seems comprehensible, the more it also seems pointless.» (11)*

But, after he encountered some criticisms, he changed his position and said:

> *«I have gotten more negative comments about that sentence than about anything else I›ve ever written. Many people who said they liked every other part of the book hated that sentence.» (12)*

And later on he pointed that out that through science one cannot detect a goal for the world (13)

Some scientists criticized Weinberg's initial saying. For example, **Alan Sandage** (an eminent cosmologist) said:

> *«The universe is so mysterious in being tuned the way it is that I am willing to keep the option open and not ask for an absolute answer; which I suspect, can never be gotten anyway. I would not have said it this way 15 or 20 years ago, but to end up like Nietzsche, sitting by a window for years rocking, not talking to anybody because of his nihilism, is not the way-even if we don›t know the path. To avoid that, I am quite willing to believe there is a purpose. Weinberg, in his sentence also states a belief, and why he is driven to that is probably as complex as why I am driven to the opposite pole. But I am not willing to be a Nietzsche nihilist, because I think that is much more pointless.» (14)*

and **James Peeble** (a noted cosmologist) considered Weinberg's claim to be an arrogant one and said:

> *«I think he must have been feeling a little down that day, perhaps a little tired, a little discouraged, a fight with his wife. I remember being surprised to see it. I have never demanded that the universe explain to me why it›s doing what it›s doing.» (15)*

And **Charles Misner** (an American cosmologist) said:

> *«I come down on just the opposite side of that. I›m impressed with the beauty and intelligibility of the universe...I don›t see the universe pointless...I*

think that in religion there are very serious things, like the existence of god and the brotherhood of man, that are serious truths that we will one day learn to appreciate in perhaps a different language on a different scale...So I think there are real truths there, and in that sense the majesty of the universe is meaningful, and we do owe honor and awe to its Creator.» (16)

And **Don Page** (Hawking's former student) said:

«I would say that there›s definitely a purpose. I don›t know what all the purposes are, but I think one of them was for God to create man to have fellowship with God. A bigger purpose may be was that God›s creation would glorify God. I am a little reluctant to say whether that›s God›s only purpose.» (17)

Finally, **Roger Penrose** had the view that

«I suppose my reaction is the opposite of the sentiment that seems to be expressed there, namely that our comprehension does give the universe a point. It›s part of how I look at mathematics. the understanding of something in terms of mathematics doesn›t eliminate a problem, it gives it a deeper character...my view is, once you have put more and more of your physical world into a mathematical structure, you realize how profound and mysterious this mathematical structure is. How you can get all these things out of it is very mysterious and, in a sense, gives the universe more of a point.» (18)

Furthermore, in response to Weinberg, who denies the presence of purpose for the world, **Paul Davies** mentions two important points: If the world is purposeless, we encounter two difficulties:

- Scientific activity is meaningless.
- The more we study the world it becomes more incomprehensible:

> *"If [the universe] isn't about anything, there would be no good reason to embark on the scientific quest in the first place, because we would have no rational basis for believing that we could thereby uncover additional coherent and meaningful facts about the world. So, we might justifiably invert Weinberg's dictum and say that the more the universe seems pointless, the more it also seems incomprehensible." (19).*

But, contrary to Weinberg's view, some scientists and philosophers in the Islamic world and in the West believe that there are some teleological hints in the contemporary science, if we look carefully. For example, in recent decades, the idea of purposefulness of the world has been revived through the so-called «anthropic principle». According to this principle, the constants of nature are so finely tuned that if they were slightly different, the carbon-based life would have not appeared, and we would not be here. But, the anthropic principle needs an explanation, and several explanations are given.

Some scientists, like **Paul Davies**, have taken the fine-tuning of natural constants as an indication of the

purposefulness of nature:

> *«The fact that it [i.e. the world] is as it is, and that its form is linked so intimately with our own existence, is powerful evidence that the universe exists for a purpose, and that in our small yet significant way, we are part of that purpose.» (20)*

From the perspective of monotheistic religions, this can be taken as an indication of design by God. But, there have been other explanations, which from my point of view, are much more complex than the theistic explanation. One of the explanations which has many proponents among contemporary cosmologists is the existence of many universes For example, **Hawking and Melodinow** said:

> *"The multiverse concept can explain the fine-tuning of physical law without the need for a benevolent creator who made the universe for our benefit." (21)*

In order to justify their position, they appealed to the M-Theory:

> *«According to M-theory, ours is not the only universe. Instead, M-theory predicts that a great many universes were created out of nothing. Their creation does not require the intervention of some supernatural being or god. Rather, these multiple universes arise naturally from physical law.»(22)*

And in response to the question about the origin of these universes, they said:

> *«These multiple universes arise from physical law.»(23)*

But, if these universes are the results of physical laws, the question arises about the origin of these laws. **John Lennox**, in response to Hawking and Melodinow's claim that physical law has created the world, says:

> *«But contrary to what Hawking claims, physical laws can never provide a complete explanation of the universe. Laws themselves do not create anything, they are merely a description of what happens under certain conditions.»(24)*

Furthermore, the hypothesis of many worlds is not less metaphysical that the hypothesis of design. In fact, As **Paul Davies** has mentioned, multiverse idea carries much heavier load of hypothesis, and is not refutable empirically:

> *«Scientifically, the many-universe theory is unsatisfactory because it could never be falsified: what discoveries would lead a many-worlder to change her/his mind? What can you say to convince somebody who enies the existence of these other worlds? Worse still, you can use many worlds to explain anything at all. Science becomes redundant, the regularities of nature would need no further investigation, because they could simply be explained as a selection effect, needed to keep us live and observing.» (25)*

Swinburne (a Well known British philosopher), too, says the same thing:

> *«To postulate a trillion trillion other universes, rather than one God in order to explain the*

orderliness of our universe, seems the height of irrationality.» (26)

Furthermore, the M-theory that **Hawking** appeals to, as Penrose has mentioned, is neither a complete theory, nor it has an empirical confirmation. (27)

It is interesting that Hawking and **Melodinow** have not learned enough from the developments in the 20th century and claim that M-theory is the last word:

«[M- theory is] the only viable candidate for a complete ‹theory of everything›.» (28)

There have been other arguments about the purposefulness of the world:

(a) The world is made of many different ports, but they are so made that they made a coherent system. For example, the forces of nature collaborate in producing coherence and harmony: What we obtain from different ports of science make a coherent network. This is an indication of programming and purposefulness.

(b) Another important point is the uniformity of nature. The laws of physics discovered in the laboratory, are working for galaxies too, and the electrons we are dealing with have the same characteristics (mass, charge, etc.) as the electrons in the moon. Furthermore, these properties do not change with time.

(c) Another evidence comes from the domain of living organisms. The fact that biological systems have specific requirements and their requirements are provided in our world has attracted the attention of some scientists.

(d) Some scientists say that the laws of physics plus the

initial conditions of the universe explain the world. But where those laws came from? And why not other laws? Thus, if some contemporary scientists don't see any purpose for the world, it is because their underlying assumptions does recognize teleological considerations, and in some scientists, atheism prevents them to look more carefully into the nature and not being confined to thesurface.

Sources

(1) Fakh al-Din Razi, al-Tafsīr al-Kabīr (Beirut: Dar`Ihya` al-Turath al-Arabi), Vol. 31, pp. 138-140.

(2) Weber, Renée, Dialogues with Scientists and Sages (London: Routledge & Kegan, 1986), p. 69.

(3) Davies, P., "The Unreasonable Effectiveness of Science", in Evidence of Purpose, John MarksTempleton, ed. (New York: Continuum, 1994), p. 56.

(4) Aquinas, Thomas, summe theologica , Pl. 1 , Ques2, art 3.

(5) Jaki, Stanley, The Relevance of Physics (Scottish Academic Press,1992), p.299.

(6) Cornwell, John, ed., Nature›s Imagination (Oxford: Oxford University Press, 1995), p.127.

(7) Dawkins, Richard, The Blind watchmaker (New York: W.W. Norton,1987), p. 5.

(8) Davies, P., «Universal Truths», The Guardian, 23 January 2003.

(9) Dawkins, Richard, River Out of Eden: A Darwinian View of Life (New York: Basic Books, 1995), p. 133.

(10) Murphy, Nancy, Reconciling Theology and Science: A Radical reformation Perspective (Pandora Press,1997), p. 13.

(11) Weinberg, Steven, The First Three Minutes (New York: Basic Books, Inc., Pub. 1977), P. 154.

(12) Lightman, Alen and Brawer, Roberta, Origins: The Lives and Worlds of Modern Cosmologists (Cambridge, Massachusetts: Harvard University Press, 1990), p. 466.

(13)http://www.pbs.org/faithandreason/transcript/wein-body.html

(14) Lightman, Alen and Brawer,Roberta, Origins, pp. 83- 84.

(15) Ibid., p.231.

(16) Ibid. pp. 248-249.

(17) Ibid., p. 409.

(18) Ibid., P.433.

19. Davies, Paul, The Goldilocks Enigma: Why Is the Universe Just Right for Life? (Great Britain: The Penguin Press, 2006), p. 18.

(20) Davies, Paul, in Evidence of Purpose, ed. By Mark Templeton (New York: Continuum, 1994), p. 56.

(21) Hawking, Stephen and Mlodinow, Leonard, The Grand Design (New York: Bantam, 2010), p. 165.

(22) Ibid., p.8.

(23) Ibid., p.9.

(24) Lennox, John, God and Stephen Hawking (London: Lion, 2011), p. 40.

(25) Davies, Paul, The Mind of God (New York: Touchstone, 1993), p.190.

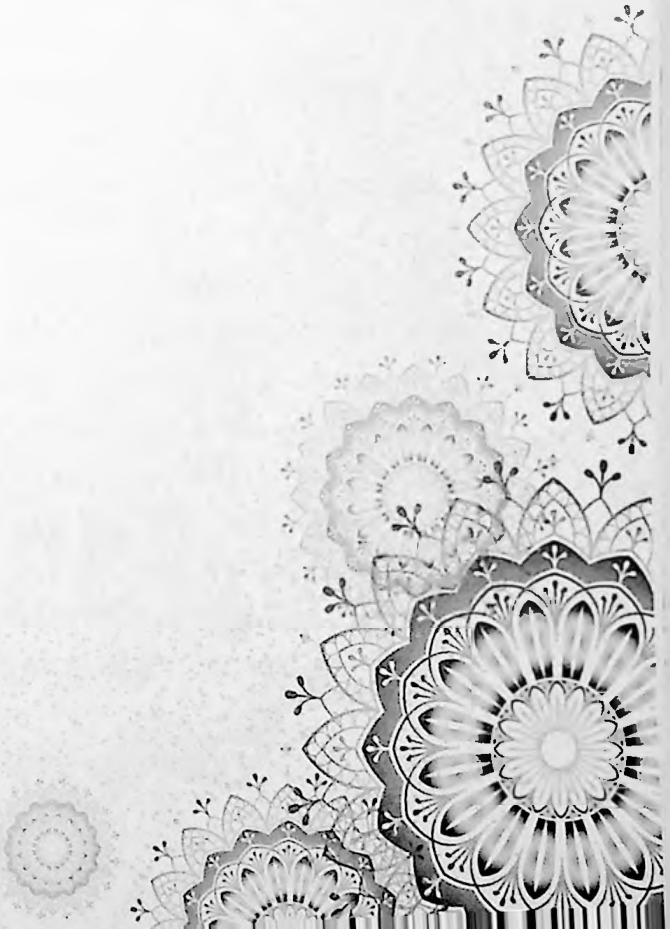
(26) . Swinburne, Richard, There Is A God (Oxford: Oxford University Press, 1996), p. 68.

(27) Penrose, Roger, "The Grand Design," Financial Times, September 4, 2010.

(28) Hawking and Mlodinow, The Grand Design, p.181.

| CHAPTER ELEVEN |

The HIMAN SOUL IS IMMORTAL



Introduction

From old times the two dimensionality of human beings has been a controversial problem among scientists and among philosophers.

In the Abrahamic religions, the human soul is considered to be immaterial and in interaction with the body. Furthermore, it is considered to be a special effusion of God to each individual human being.

Here, we are going to mention some common views about the human soul.

In our time, the words mind and consciousness are used , in relation to spirit or soul. In addition to the religious perspective, there are some other ideas about mind and consciousness. Furthermore, although from the naturalistic viewpoint of modern science, there is no place for mind or consciousness as a novel and immaterial subject, but there are some important ideas about this subject from some of the eminent contemporary philosophers and scientists. In this article, we mention and analyze some of these important ideas.

(1) The empirical and naturalistic viewpoint of modern science

In modern times, with the growth of empiricism in the scientific circles, human mind (soul or spirit) is considered to be a by-product of the material brain. Theories like evolution fortified this view.

In order to avoid their inability in explaining the human consciousness ,the empiricists appeal to the idea of complexity , and consider the human mind as an emergent property of the material brain, and explainable in terms of neuronal interactions.

In recent decades some eminent physicists and biologists have revived the idea of immaterial mind (consciousness or soul) and believe that it is not explainable in terms of material interactions.

(2) Muslim philosophers' view about the human soul (mind or consciousness)

Muslim philosopher's believe that human beings have, in addition to their body, an immaterial element, called soul, which is God's effusion after its material ground is provided. This is in concordance with the Qur'anic concept of the human soul:

> *" When your Lord said to the angels,' Indeed I am about to create a human being out of clay. So when I have proportioned him and breathed into him of My spirit, then fall down in prostration before him.'." (38: 71-72)*

Mutahhari(an eminent contemporary Muslim Philosopher)

describes the position of Muslim philosophers:

> *"When the capacity for the appearance of life is developed in matter, life is endowed to it [by God]. In other words, matter, in its development, becomes alive. It acquires some perfection that it lacked, and bears effects and activities that it was lacking before." (1)*

Mutahhari admits that some physicochemical processes are necessary to produce life effects, but he does not consider them to be sufficient: A radio is necessary to receive the signals sent by a transmitter but it is not sufficient. In **Mutahhari's** words:

> *"The synthesis, addition, subtraction and combination of parts of matter are necessary conditions for the appearance of life, but they are not sufficient."(2)*

Muslim philosophers have given several arguments for the immateriality of the human soul. Here we mention some of them. (3)

(i) In human being, various developments occur from their birth to their death, but throughout their life they feel the same personality. If a person was only a collection of his activities, he should feel different personalities. In addition , we have a feeling of ourselves without needing a mediator , and the property of our self-awareness does not have any similarity to physical properties like time, position, energy , etc., which are necessary to explain the neuronal activities of the human brain.

(ii) Human beings have an understanding of general

concepts, which have no dimension or mass. This implies that human soul has no mass or dimension. Thus, it is not material.

(iii) While our body organs are worn out with the passage of time, our thinking capacity and understanding increases with our age. Thus, there has to be an immaterial capacity responsible for this fact.

(iv) We have dreams about non-precedent accidents in the future. This indicates the immateriality of human soul, as matter is tied to time.

(3) Western philosophers' arguments About the immortality of the human soul

(i) It is difficult to understand where the sense of free will comes to us, as our bodies are made of atoms which follow natural laws. In fact, our feeling about ourselves is not like that of a machine. We feel the sense of freedom in ourselves. In the words of **Henry Stapp** (an eminent American mathematical physicist):

> *"Because we know that our thoughts and mental efforts exist, and hence probably have an important function, is it not an irrational tour de force to try to show that they exist, yet they have no causal power." (4)*

(ii) It is true that living organisms are made of chemical matter and involve many proteins and in some ways work according to physical rules, but this does not prove that nothing else is at work. In fact interactions of matter prepare the ground for the emergence of life , i.e. they

are necessary conditions for the emergence of life , but they are not sufficient condition for it. **Rupert Sheldrake** (an eminent British biologist) has illustrated the matter beautifully. Suppose that somebody who has not seen a radio, finds one in a desert. When he turns a switch, he hears a music. He thinks that the music originates from the radio itself. If somebody tells him that the voice comes from a transmitter, he might not believe it. When he removes a part from the radio he does not hear any voice. So, this fortifies his belief that the voice comes from the radio itself. But, he does not know that the voice originates from a transmitter. Thus, although the radio is necessary to get the voice, it is not sufficient. A transmitter has to be present.(5)

(iii) The prevalent view restricts the reality to what is discoverable through physicochemical processes. But this is not provable through science per se , but is rooted in the naturalistic view, which is popular in the present scientific circles. **Roger Trigg** (an eminent British philosopher) describes the matter beautifully:

> *"Why should not a transformed science one day even be able to accept the existence of 'spiritual' realities? Only a metaphysical decision now that such things cannot exist would suggest that that is impossible. The question is whether we are concerned with the nature of reality, or with the validity of a scientific method tailored to current human capabilities." (6)*

(iv) Mental events lack the spatiotemporal properties of material objects.

Thoughts and feelings do not have mass, spatial extension, or temporal location, whereas material objects have these properties.

(v) Some mental events involve abstract ideas like mathematical objects.

(vi) Some mental events, like near death experiences, occur when no brain activity is present .(7)

(vii) The human mind is self-aware, while material objects lackself-awareness.

Human beings are not only conscious, but they are conscious of their consciousness. (8)

(4) Contemporary Western Scientists and Consciousness (mind, soul)

We can divide the views of the contemporary Western scientists

concerning this subject into the following groups.

(i) Many of the contemporary scientists believe that the human mind is simply physical brain activity, in which material particles and neurons in the brain are responsible for human thoughts and beliefs. In their belief, consciousness is material, and is explainable in terms of physics and chemistry. **Francis Crick**, one of the discoverers of DNA molecule, says:

> *"The astonishing Hypothesis is that "you," your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated*

molecules".(9)

Edward Wilson (a well-known American biologist) has the same view, but he does not believe that the human consciousness is explainable by the present science:

> *"FINALLY, given that conscious experience is a physical and not a Supernatural phenomenon ,might it be possible to create an artificial human mind? I believe the answer to this philosophically troubling question to be yes in principle, but no in practice, at least not as a prospect for many decades or even centuries to come .(10)*

Hawking and Mlodinow , in their book, "The Great Design" ,deny any agent besides physical laws about the human brain. (11) Furthermore, they conclude that the human free will is an illusion. (12)

(ii) Some scientists believe that consciousness is physical, but that its explanation is difficult with our present science, but in the long run empirical knowledge will explain it. In an interview in 2005, **Richard Dawkins** (A well-known British evolutionary biologist), in response to the question of whether we can explain consciousness through science , said:

> *"To me, human consciousness is a deep, philosophically mysterious manifestation of brain activity and is in some sense a product of Darwinian evolution. But we don›t yet really have any idea how it evolved and where it fits into a Darwinian view of biology. I don›t know whether it will yield to a sudden flash of enlightenment,*

whether it will become one of those rather messy problems that never really get a proper solution, or whether it will eventually turn out that there never was a problem at all and that we were actually making up problems where there really weren't any. From where I sit, it seems to be a deeply difficult problem that has always been a philosophical problem but which I think is ripe for a take-over by evolutionary biology once we think how to do it." (13)

Karl Popper (an eminent Austrian-born British philosopher) believed that the origin of life will always remain untestable, and even if scientists create life in the laboratory, they can never be sure that life actually started that way .(14)

In a book Written with John Eccles , Popper says that spirit is evolutionally emergent from brain , but it has some degree of independence that does not permit to explain it in terms of physics and chemistry . (15)

In the same line , Arthur Peacocke sees the human brain to be the most complex matter. Thus, it is not surprising that brain's activities are not reducible to atoms, motions and the releasing of neurons. Because when a complex system is formed from simple parts and shows an emergent property, the emergent property cannot be explained in terms of the properties of the parts. Thus, we should not be surprised that the activities of the human brain are not explainable in terms of the motions of atoms and the release of neurons. (16)

(ii) Some of the eminent scientists of our time don't

see the human consciousness to be explainable in terms of the contemporary science, and believe that some developments should take place in the contemporary science to be able to explain consciousness. **Wigner**, an eminent physicist of our time, believed that the present laws of physics should be replaced by new laws containing new concepts, if we want to explain consciousness. It is not enough to change the interpretation of the present laws. (17)

Roger Penrose (an eminent contemporary mathematical physicist) believes that our present science is not capable of explaining consciousness. New scientific activities are needed:

> *"My position [on consciousness] demands a major revolution in physics.... [T]here is something very fundamental missing from current science. Our understanding at this time is not adequate and we're going to have to move to new regions of science...." (18)*

Andre Linde (a prominent Russian-American theoretical physicist) believes, through a detailed analysis, that confinement to the standard materialism is wrong, as the problems of consciousness, life, and death of human beings are not solved:

> *"According to standard materialistic doctrine, consciousness, like spacetime before the invention of general relativity, plays a secondary, subservient role, being considered just a function of matter and a tool for the description of the truly existing*

material world. Let us remember, though, that our knowledge of the world begins with perceptions, not with matter. I know for sure that my pain exists, my "green" exists, and my "sweet" exists. I do not need any proof of their existence, because these events are a part of me; everything else is a theory. Later we find out that our perceptions obey some laws, which can be most conveniently formulated if we assume that there is some underlying reality beyond our perceptions. This model of the material world obeying laws of physics is so successful that we too readily forget our starting point and come to think that matter is the only reality, and that perceptions are only helpful for its description. This assumption is almost as natural (and maybe as false) as our previous assumption that space is only a mathematical tool for the description of matter. In fact, we are replacing the reality of our feelings with a successful theory of an independently existing material world. And the theory is so successful that we almost never think about its limitations until we are forced to address those deep issues which do not fit into our model of reality... Is it not possible that consciousness, like spacetime, has its own intrinsic degrees of freedom, and that neglecting these will lead to a description of the universe that is fundamentally incomplete? What if our perceptions are as real (or maybe, in a certain sense, are even more real) than material objects? What if my red, my blue, my pain, are really existing objects, not merely reflections of the really existing material world? Is it possible to

introduce a "space of elements of consciousness," and investigate the possibility that consciousness may exist by itself, even in the absence of matter, just like gravitational waves, excitations of space, may exist in the absence of protons and electrons?... It is best not to repeat old mistakes, but instead forthrightly to acknowledge that the problem of consciousness and the related problem of human life and death are not only unsolved, but at a fundamental level are virtually unexamined. (19)

(iii) Some very eminent scientists do not believe that consciousness can be reduced to matter; rather, they believe that human consciousness can never be explained by empirical science. Here we mention the views of some of these scientists.

- **Erwin Schrödinger** (a prominent Nobel Prize-winning Austrian-Irish physicist) said:

"Consciousness cannot be accounted for in physical terms. For consciousness is absolutely fundamental. It cannot be accounted for in terms of anything else." (20)

He also said:

"We shall not expect the natural sciences to give us direct insight into the nature of the spirit."(21)

In explaining his position, **Schrödinger** said:

"I am very astonished that the scientific picture of the real world around me is very deficient .It gives a lot of factual information, puts all our experience in a magnificently consistent order,

but it is ghastly silent about all and sundry that is really near to our heart, that really matters to us. It cannot tell us a word about red and blue, bitter and sweet, physical pain and physical delight; it knows nothing of beautiful and ugly, good or bad, God and eternity. Science sometimes pretends to answer questions in these domains, but the answers are very often so silly that we are not inclined to take them seriously. "(22)

Max Planck (A distinguished German Nobel Laureate in physics) , in response to the question. "Can we explain consciousness in terms of matter", said:

"No, I regard consciousness as fundamental. I regard matter as derivative from consciousness. We cannot get behind consciousness. Everything that we talk about, everything that we regard as existing, postulates consciousness." (23)

In our time, **Edward Witten** (A major figure in the string theory) has the same view. He believes that his string theory may one day turn out to be true, but we shall never explain the consciousness:

"I think consciousness will remain a mystery. Yes, thatɔs what I tend to believe. I tend to think that the workings of the conscious brain will be elucidated to a large extent. Biologists and perhaps physicists will understand much better how the brain works. But why something that we call consciousness goes with those workings, I think that will remain mysterious. I have a much easier time imagining how we understand the

Big Bang than I have imagining how we can understand consciousness. "(24)

George Ellis (a distinguished South African cosmologist) denies that consciousness has been explained:

"We have no idea how consciousness arises, despite some extravagant claims that consciousness has been explained or that there is no hard problem of consciousness. Despite much investigation of the neural correlates of consciousness, we do not even know how to ask the right questions about haw qualia arise. There is not even a beginning of an approach. One should beware of neuroscientists or philosophers claiming much more than has been proven or understood." (25)

Furthermore, he considers the idea of soul a valid one:

"The concept of a soul is as valid as any other concept to describe the holistic aspects of the way the mind inhabits the body. "(26)

Besides some distinguished physicists, some eminent biologists and neurologists too, see the problem of consciousness as dilemma. For example, **Michael Ruse**, the most well-known philosopher of biology, says:

«Why should a bunch of atoms have thinking ability? Why should I, even as I write now, be able to reflect on what I am doing and why should you, even as you read now, be able to ponder my points, agreeing or disagreeing, with pleasure or pain, deciding to refute me or deciding that I am just not worth the effort? No one, certainly not the Darwinian

as such, seems to have any answer to this." (27)

Wilder Penfield (a prominent American-Canadian neurosurgeon),who has performed more than 1000 brain surgeries, reached to dualism ,i.e. the existence of the immaterial spirit:

> *"The nature of mind presents the fundamental problem, perhaps the most difficult and most important of all problems For myself, after a professional lifetime spent in trying to discover ,during this final examination of the evidence, that the dualist hypothesis (the idea that mind is separate from the brain) seems the more reasonable of explanations...what a trill is ,then, to discover that the scientist ,too, can legitimately believe in the existence of spirit." (28)*

Benjamin Libet (a pioneer in the field of human consciousness)) , whose experiments in 1980's propagated a materialist interpretation of consciousness, changed his mind , and in an article in 1999 said:

> *«We would not need to view ourselves as machines that act in a manner completely controlled by the known physical laws.» (29)*

And in a book that he wrote in 2005, he said:

> *«As a neuroscientist investigating these issues for more than thirty years, I can say that these subjective phenomena are not predictable by knowledge of neuronal function. This is in contrast to my earlier views as a young scientist, when I believed in the validity of determinist*

materialism. That was before I began my research on brain processes in conscious experience, at age 40. There is no guarantee that the phenomenon of awareness and its concomitants will be explainable in terms of presently known physics.In fact, conscious mental phenomena are not reducible to or explicable by knowledge of nerve cell activities. You could look into the brain and see nerve cell interconnections and neural messages popping about in immense profusion. But you would not observe any conscious mental subjective phenomena. Only a report by the individual who is experiencing such phenomena could tell you about them.»(30)

And he added that:

«Also, it is possible that some mental phenomena have no direct neuronal basis (see Chapter 3) and it is also possible that the conscious will does not always obey the natural laws of the physical world (see Chapter 4).»(31)

Maurice Wilkins (a New Zealand-born British physicist and molecular biologist, and a Nobel laureate in Medicine) believes that the whole life cannot be explained by a mechanical view:

"I don't agree with the molecular biologists who think that the whole nature of life can be comprehended in terms of molecular biology alone .I think that is a very simple-minded, mechanistic way of thinking. " (32)

George Wald (an American biochemist who won Nobel

Prize in Medicine) argued that mind is not understandable by science:

> *" I come to the end of my life as a scientist facing two great problems. Both are rooted in science, and I approach both as would only a scientist. Yet I believe that both are irrevocably – forever – unassimilable as science. And that is hardly strange, since one involves cosmology, the other consciousness. Mind is not only not locatable, it has no location. It is not a thing in space and time, not measurable; hence – as I said at the beginning of this paper – not assimilable as science." (33)*

(iv) Some eminent contemporary scientists not only consider human consciousness immaterial, but they consider it as a special effusion of God given to the growing fetus in his/her mother's belly: In the words of **John Eccles** (an Australian neurophysiologist and philosopher who won Nobel Prize in Physiology or Medicine):

> *"Since materialist solutions fail to account for our experienced uniqueness, I am constrained to attribute the uniqueness of the Self or Soul to a supernatural spiritual creation. To give the explanation in theological terms: each Soul is a new Divine creation which is implanted into the growing foetus at some time between conception and birth...This conclusion is of inestimable theological significance. It strongly reinforces our belief in the human Soul and in its miraculous origin in a Divine creation.." (34)*

Eccles believed that evolution can explain brain, but only

something transcendental can explain consciousness:

> *"Several years ago the great Australian neurobiologist, Sir John Eccles, ended a Harvard lecture on brain organization by admitting that although evolution could account for the brain, it could not, in his view, account for the mind, with its mysterious capacity for consciousness and thought: only something transcendent could account for that." (35)*

He also identifies consciousness with the human soul:

> *"We have to recognize that we are spiritual beings with souls existing in a spiritual world (Section 10.7) as well as material beings with bodies and brains existing in a material world. "(36).*

Neville Mott (a British physicist who won Nobel Prize in physics), too, believes that consciousness is not explainable by science:

> *«I believe .. that neither physical science nor psychology can ever 'explain' human consciousness. To me, then, human consciousness lies outside science, and it is here that I seek the relationship between God and man.»(37)*

The view that human soul (consciousness) is God's effusion to a human being, has been shared by the majority of Muslim philosophers and scientists. In the words of **Mutahhari** (an eminent contemporary Muslim philosopher):

> *"The Qur'an's logic concerning life is that an effusion [of Allah], at a higher level than the*

sensible body horizon... This logic is based [on the fact that] sensible matter, by itself, lacks life and that life is an effusion and a light from a higher source " (38)

(v) Some scholars have differentiated between brain and mind, and have simulated their relations to computer and its operator. **Kurt Gödel** (the most original and important logician of the twentieth century) considered human brain to be a computer which is connected to the soul:

"The brain is a computing machine connected with a spirit. " (39)

Finally, **Wolfgang Pauli** (one of the pioneers of quantum physics and a Nobel Laureate in physics) changed his mind in the last decade of his life and considered matter and mind as complementary aspects of a reality:

" To us...the only acceptable point of view appears to be the one that recognizes both sides of reality- the quantitative and the qualitative ,the physical and the psychical as compatible with each other, and can embrace them simultaneously ...It should be most satisfactory of all if physics and psyche(i.e., matter and mind) could be seen as complementary aspects of the same reality." (40)

(6) Summary

We can summarize the views of the contemporary Western scientists into the following five groups:

(i) A large number of scholars believe that consciousness is explainable in terms of the contemporary science, i. e. reducible to matter.

(ii) some scholars believe that consciousness (mind or soul) is material, but it is not explainable in terms of the present science. Of these people some scholars believe that future science can explain it, but some scholars consider consciousness to be a complex system, and thus it cannot be explained in terms of its parts.

(iii) Some scholars do not consider the human consciousness to be material. Of these scholars, some consider consciousness to be a God's effusion, but some believe that the world is so programmed that the immaterial soul shows up at a certain stage.

(iv) some scholars see the relation of brain and mind like the relation of a computer and its operator.

(v) some scholars like Pauli considered mind and brain complementary aspects of the human reality.

Thus, in spite of the prevalent idea of considering mind as a subsidiary of brain, some very distinguished Western scholars do not consider human consciousness to be explainable by empirical science, and the view of some of them is very close to that of the three Abrahamic religions. It is also interesting that even those who consider the human consciousness to be material do not see it explainable by the present science.

In my view, the philosophical arguments of both Muslim philosophers as well as theist Western philosophers for the immateriality of human soul (consciousness or mind) are strong enough and have not been refuted by materialist philosophers and scientists. Furthermore, this view is in concordance with that of the three Abrahamic religions.

References

1. M. Mutahhari , Collected Works ,Vol. 13, in Persian (Tehran: Sadra Publications, 1975), 41-42.

2. Ibid., 38.

3. M. Mutahhari , Resurrection, in Persian (Tehran: Mutahhari Institute, 2007) , 149-153.

4. H. Stapp , Quantum Theory and Free will (New York: Springer, 2017), 43.

5. A. Varghese, ed., Intellectuals Speak out about God : A Handbook for the Christian Student in a Secular Society (Washington: Regnery Publishing,1984), 56-57.

6. R. Trigg , https://www.faraday.st-https://www.faraday.st-edmunds.cam.ac.uk/CIS/trigg_lecture.pdf

7. J. M. Holden , "Response to 'Is it Rational to Extrapolate from the Presence of consciousness During a Flat EEG to survival of consciousness after death?' " , Journal of Near-death Studies. 29:2 (2010), 362-367.

8. R. Swinburne , Are We Bodies or Souls , Chapter 5 (Oxford: Oxford University Press, 2019).

9. F. Crick, The Astonishing Hypothesis: The Scientific Search for Soul (New York: Charles Scribner's Sons,1994), 3.

10. E. Wilson , Consilience: The Unity of Knowledge (New York: Vintage Books 1998) , 132.

11. S. Hawking and W. L. Mlodino , The Grand design (New York: Bentam, 2010), 32.

12. Ibid.

13. F. Miele , " Darwin's Dangerous Disciple", An interview with Richard Dawkins (2005); https://scepsis.net/eng/articles/lid_2.php

14. J. Horgan , The End of Science (New York : Little , Brown and Company , 1997), 38.

15. Michael J.H. Wong, , Ricoeur and the Third Discourse of the Person: From Philosophy and Neuroscience to Psychiatry and Theology (Lanham: Rowman &Littlefield, 2018), 27.

16. A. Peacocke , Creation and the World of Science (Oxford: Oxford University Press, 2004), 152-153.

17. J. Wheeler, and W. Zurek, Quantum theory and Measurement (Princeton , Princeton University Press, 1983), 99.

18. K. Giberson ," The Man Who Fell to Earth ,Interview with Sir Roger Penrose", Science and Spirit, March/April 2003, 34-41.

19. A. Linde , "Universe, Life, Consciousness" in Science and Spiritual Quest: New Essays by Leading Scientists, ed. By Mark Richardson et. al. (Abingdon: Routledge, 2002), 200-202.

20. E. Schrödinger, "General Scientific and Popular Papers," in Collected Papers, Vol. 4.(Vienna: Austrian Academy of Sciences (Friedr. Vieweg & Sohn, Braunschweig/Wiesbaden, 1984), 334

21. J. Giotschl , ed., (1992), Erwin Schrödinger›s World View: The Dynamics of knowledge and Reality (Berlin/Heidelberg: Springer Science+ Business Media, B.V., 1992), 130.

22. E. Schrödinger, Nature and the Greeks (Cambridge : Cambridge University Press.,2014), 95.

23. Max Planck, "The Originator of Quantum Theory", The Observer , January 25,1931.

24. J. Horgan , «World›s smartest physicist› believes consciousness will remain unsolvable», Scientific American, August 19, 2016, 38.

25. G. Ellis , in Science & Religion, ed. by Gregg D. Caruso (Automatic Press, 2014), 63.

26. Ibid. , 65.

27. M. Ruse, (2000), Can a Darwinian Be a Christian? (Cambridge: Cambridge University Press, 2000) ,73.

28. W. Penfield , The Mystery of the Mind (Princeton: Princeton University Press, 1975), 85.

29. B. Libet , " Do We have Free Will? " , Journal of Consciousness Studies, 6: 8-9 (1999), 56-57.

30. B. Libet , Mind Time: The Temporal Factor in Consciousness (Cambridge, Massachusetts: Harvard University Press,2005), 27.

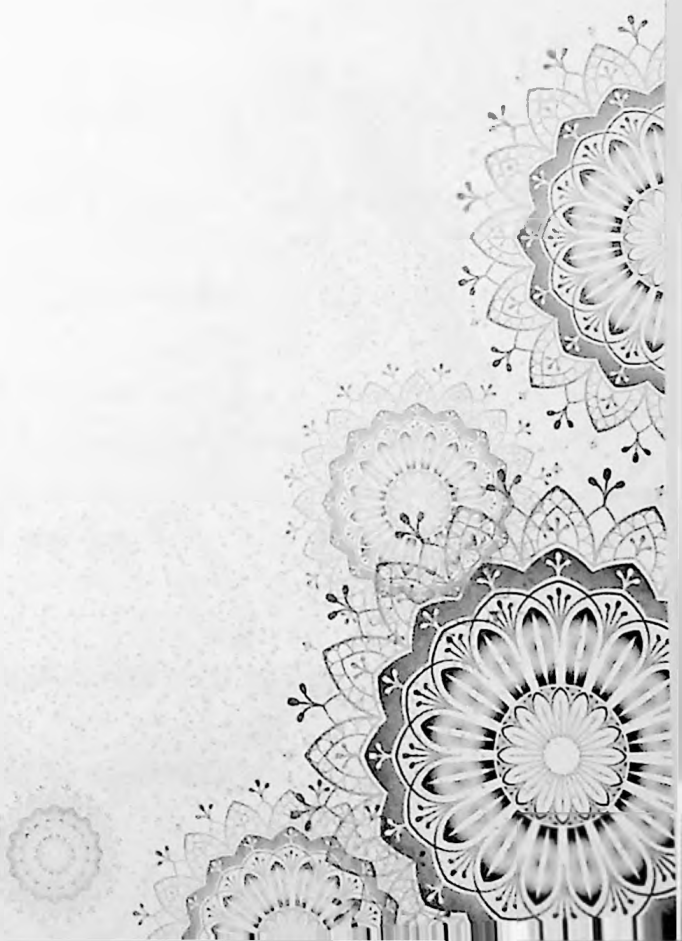
31. Ibid. , 184.

32. T.D. Singh .and R. Gomatam , eds. , Synthesis of Science and Religion (Bomay: The Bhaktivedanta Institute ,1987), 33.

33. Ibid. , 17-18.
34. J. Eccles , Evolution of the Brain: Creation of the Self (London: Taylor & Francis,2005), 249.
35. J. Bergman , «John C. Eccles ,Nobel laureate and Darwin doubter» , Journal of Creation, 24:2(2010) , 85.
36. J. Eccles , Evolution of the Brain: Creation of the Self , 253
37. N. Mott , Can Scientists Believe? Some Examples of the Attitude of Scientists to Religion (Oxford: Taylor and Francis. 1997), 8.
38. M. Mutahhai , Collected Works , Vol. 13 , 56.
39. Hao Wang , A Logical Journey: From Gödel to Philosophy, (Cambridge: The MIT Press, 1996), 189.
40. T.D. Singh .and R. Gomatam , eds. , Synthesis of Science and Religion, 20.

| CHAPTER TWELVE |

THE HEREAFTER



Introduction

The idea that death is not the end of human life has been a principle in all monotheistic religions. Resurrection means return to God. The idea of resurrection was introduced first by prophets. But, there has been different understandings about resurrection:

- Some have Taken it to mean the life of soul after death (with or without body).
- Some believe in the return of a soul to another body in this world.
-In Hinduism or Buddhism, they believe in the penetration of the soul into God.
- Some believe in the biological eternity, i.e. we survive through our children (i. e. something from us remains in them).
- Some believe in the social eternity, i. e. We survive through the effect of our words on next generations.

(1) The Necessity of Resurrection in Monotheistic Religions

There have been several arguments for the necessity of resurrection.

(a) The argument from the purposefulness of nature.

We see a coherence between different parts of nature. The universe develops as a unit. Thus, a goal is necessary for it, and by reaching that goal there is going to be stability. The Qur'an considers the hereafter as the place of tranquility:

> *"This life of the world is only a [passing], enjoyment, and indeed the hereafter is the abiding home." (Ghafir/39).*

The argument is that if the end of human life is in this world, then our creation is futile.

(b) The Wisdom Argument

This argument says that from wise God we don't expect something aimless, and since the world is God's creation, it is purposeful. The Qur'an does not consider world's creation an aimless act:

> *"We did not create the heavens and the earth and whatever is between them for play." (Al-Dukhan/38).*

The existence of here after prevents the aimlessness of the mundane life. This argument was also given by Thomas Aquinas. He considered human happiness to be received by God. (1)

(c) Compassion Argument

This argument is based on the assumption that God has provided ways for the perfection of every being, and since human beings have the capacity for an eternal blissful life, thus God has provided the way for achieving this:

"The [God] has made mercy incumbent upon Himself. He will surely gather you on the day of resurrection." (Al-Ana›m/12).

It is also said that since some brilliant youth die in the early life, there should be another opportunity to get why they deserve.

(d) Truth Argument

This argument says that since God is absolute truth, He would destroy any falsehood. But we see in the world some falsehood and in this world they are not taken care of. Thus, there should be a place where falsehood is suppressed and truth can manifest itself:

"That is the day of the truth. So, let anyone who wishes take resort with his Lord." (Al-Nab›a/39)

(e) Justice Argument

This argument is based on the fact that God gives the reward or punishment of every act, as there has to be a difference between those who do good things and those who do bad things. But, this does not happen always in this world. Thus, there should be a world in which the two cases are differentiated. According to the Qur'an:

"Shall we treat those who have faith and do righteous deeds like those who cause corruption on the earth." (Sad / 28)

(f) Eagerness for Eternal Life in Human Beings

The eagerness for eternal life seems to be an instinct, given by God. But this world is not eternal. Thus, there should be another opportunity where eternal life is accomplished. If there is no opportunity for eternal life, then the instinct

of eagerness for eternal life is pointless.

(g) Moral Argument

This argument starts with some moral introduction. Since there is not enough opportunity in this world for access to moral ideals, the life after death is necessary to achieve that goal.

(2) Arguments for the Possibility of Resurrection

(a) Using Similarities

It said that if two phenomena are completely similar, then all positive or negative rules that governs one, it is also applicable to the other one. Now, there is no doubt that our world exists. Thus, the existence of another world similar to it is also possible; otherwise, the two would not be similar. The **Holy Qur'an** says:

> *"Is not He who created the havens and the earth able to create like of them. Yes indeed! He is the All- Creator All – knowing." (Yasin / 81)*

(b) The Reviving of Plants

The best example for the revival of the deed is the revival of plants, that each year is repeated. We also have the case of sleep and awakenings in humans. In the winter plants apparently die, though the essence of life is present in them, though hidden, but with the rains they show up their essence. When humans die, angels take their spirit and then there will be the hereafter.

(c) Argument through the Meaningfulness of the world

Kurt Gödel (an eminent contemporary Logician)

presented the following argument for the hereafter: Here is his argument:

Science shows that order is prevalent in the world. That indicates that the world is meaningful. But human being actualizes a small part of their capacity in their life. Thus, there should be a hereafter; otherwise, their capacities would be fruitless.

Furthermore, science indicates that our world had a beginning and it has an end. This brings in the possibility of another world. As we grow, we learn, but before we make use of them, we die. Since there should not be meaningless loss, our main learning would be in the next world. (2)

(3) Arguments for Immateriality of Human Soul

Humans have an immaterial part called soul, which does not have the properties of matter and does not die. Resurrection does not mean coming back to life; rather it means its return to body. Now, we go over the arguments for the immateriality of human soul.

(a) The infiniteness of the Learning Capacity of Humans

We are witnessing the fact that the learning capacity of humans is limitless, but if the place of science was in human cells, there would be limitations. How a large amount of information can be accommodated in a small cortex, which is only a few centimeters. At the old age, the body tools have become show; but the capacity is there. Thus, our infinite capacity for learning is an indication of a non-material soul.

(b) Human wishes are not limited

Whatever a human being gets, he is after more. Some scholars considered this to be an indication that humans are after absolute perfection. In the case of material beings there is a proportion between a container and its contents. Thus, the limitless wishes of humans cannot be due to a material being.

(c) The preservation of human Personality

There is something in humans to which all activities of mind and body is attributed and we refer to it by "I". This fact remains true throughout one's life. We pass from childhood to old age, but there is something to which we refer throughout these stages.

Every human being feels that in spite of all changes of his/her states, there is some constant fact in him. If this was a material thing, this would not be the case. Because, change is a requisite of material beings, such as human cells. All parts of a human body are changed every few years, but his/her personality does not change. If the personality of humans was in their cells, the attribution of "I" to it would be false. The unity of the subject through all developments of human body indicates the immateriality of human soul.

(d) Perceiving universals

A characteristic of humans is the perception of universals. But such a concept is not present in the external world. We perceive universal concepts that are only present in our minds. In Mulla Sadra's, view our regular senses have access to the apparent face of things and through them we cannot learn their reality (3). But our intellect has such an

ability. In fact, through our senses we have access only to sense impressions. But, whether these impressions are present outside of our mind or not is only provable through our intellect. For example, we never sense the causal relation between two things. It is only the intellect that discovers the causal relation: As **Avecinna** emphasized, our senses only notice the following of something after another one, not the causal relation. (4)

A materialistic outlook cannot explain the rational ability of humans. If as some scholars, like Francis Crick, say our intellectual power is not anything but the activity of our neural system, how can we the explain abstract concepts? How can we explain the readiness of human mind for finding the truth? Why a good logic is better than a bad one? Materialism cannot explain human consciousness or free will. In a material world these things cannot be present, as matter cannot be free.

(e) Indivisibility

Divisibility is a property of matter. Even the indivisible particles of physics are divisible rationally. But "I" is indivisible, and this is an indication of its immateriality. It was Plato who argued that soul is eternal, as it is incorruptible and it is incorruptible because it is indivisible, and it is indivisible, as it is simple. Aquinas accepted this argument and transformed it to one of the principles of Catholic theology.

(f) The Unity of a person

A person, can hear, see and talk at the same time. This is an indication of the immateriality of human soul, as all of

these are attributed to one thing. This internal power that is the source of human abilities, is soul.

(g) The knowledge of humans about themselves, while neglecting themselves

It may happen that humans are unaware of their body organs, but they are never unaware of themselves even if they are sick. If our soul is the same as our organs, humans may forget themselves or may not. Thus, those who have some deficiencies in their organs, their soul would be deficient too.

(h) Human Free Will

We feel that we have moral responsibility. But for this we have to be free agents. If we one confined to our organs only, then our choices are determined. Thus, we are not free and we should not be responsible for our actions. This means that we should own something that permits us to choose freely, and that is the immaterial soul.

(i)Inability of Science to explain human consciousness

The idea that humans have a material and a spiritual dimension is an old one, but in our time, materialist leave no room for immaterial beings and consider life a by-product of physics and chemical reactions. In the words of **Francis Crick**:

> *"The astonishing Hypothesis is that "you," your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated*

molecules". (5)

But this belief cannot be concluded from the science itself, but is rooted in a naturalist philosophy which is prevalent in the contemporary academic circles. On the other hand, there are some very eminent physicists and biologists who don't believe that physics can provide an explanation for life or human consciousness. For example, **Niels Bohr** says:

> *«The existence of life must be considered as an elementary fact that cannot be explained, but must be taken as a starting point in biology.» (6)*

And so says **Erwin Schrodinger**:

> *"Consciousness cannot be accounted for in physical terms. For consciousness is absolutely fundamental. It cannot be accounted for in terms of anything else." (7)*

In response to the question of whether we can explain consciousness in terms of matter, **Max Planck** said:

> *"No, I regard consciousness as fundamental. I regard matter as derivative from consciousness. We cannot get behind consciousness. Everything that we talk about, everything that we regard as existing, postulates consciousness." (8)*

But some of the eminent scholars of our time not only do not see consciousness to be explainable by empirical science, but consider it a special Grace of God. For example, **John Eccles** (a Nobel Laureate in Medicine) says:

> *"Since materialist solutions fail to account for our experience uniqueness, I am constrained to attribute*

the uniqueness of the Self or Soul to a supernatural spiritual creation. To give the explanation in theological terms: each Soul is a new Divine creation which is implanted into the growing foetus at some time between conception and birth." (9)

And so says **Neville Mott** (a Nobel Laureate in physics):

"I believe, too, that neither physical science nor psychology can ever 'explain' human consciousness... To me, then, human consciousness lies outside science, and it is here that I seek the relationship between God and man." (10)

Edward Witten (a distinguished cotemporary physicists) believes that consciousness will always remain a mystery:

«I think consciousness will remain a mystery. Yes, that›s what I tend to believe. I tend to think that the workings of the conscious brain will be elucidated to a large extent. Biologists and perhaps physicists will understand much better how the brain works. But why something that we call consciousness goes with those workings, I think that will remain mysterious. I have a much easier time imagining how we understand the Big Bang than I have imagining how we can understand consciousness... « (11)

Thus, some of the eminent scientists of the day don›t reduce human beings to a material entity.

(4) Some Empirical Evidences for the Immortality of soul

(a) Near death Evidences

The experiences of some people who have nearly died or apparently died (i. e. they have lost the signs of life, such as heart beat), and then have regained consciousness, indicates that they had the feeling that they were leaving their bodies and were seeing their surroundings. In the case of those who acquired their consciousness, their feeling was that they have a new body. (12)

They said that after this experience, they passed through a dark tunnel and entered into a place where they encountered some non-physical agents that communicated with them through telepathy. They also encountered a clergy that helped them to evaluate their past. Furthermore, although they wanted to remain in that state, they were told to return to their physical body. This period has been between a few seconds up to 20 minutes.

Of course, some people have considered these experiences to be hallucination, and it has been due to some physiological conditions of body that caused people to have extra-ordinary experiences.

(b) Another argument refers to the psychological researches for the case of those who held a session to communicate with the spirit of a dead person. Those experiences indicate that people are alive after their death. Some experiences are difficult to explain. For example, a farmer in North Carolina informed his son, four years after his death, where his lost will is?

(c) Some experiments have shown that people can have telepathic communication though they are far from each other, even when one of them is besieged in a room with walls made of lead.

Some people have accepted these evidences, but some people have said that no supra-natural phenomenon has been repeated satisfactorily.

(5) Arguments Against Immortality

- It is said that the states of consciousness are nothing but physico-chemical processes that occur in simple muscles. For example, it is said that a damage to the center of the vision in the mind causes the loosing of vision. Thus, consciousness is not separate from brain's tools. Furthermore, various drugs cause changes in the mental state of people.
- It is paid that if an idea is not material, it cannot cause material effects, such as contraction of muscles.
- It is said that if a material accident happens through a non-material cause, this would lead to the violation of the law of conservation of energy, as it requires the addition of energy to the nervous system from nowhere.
- It is said that there is a continuity between animals and humans. Thus, if the consciousness of humans is saved, why this is not the case for animals.

(6) Responses of Theist Philosophers

- These philosophers admit that changes in the brain affects the mentality and that damage to the brain disturbs the activities of mind, but in their view, this does not lead to

the conclusion that spirit and its activities are the physico-chemical by- products of the brain, As the brain and nervous system are tools by which mind does its works. Human intellect uses brain, but brain is not consciousness. Kurt Gödel, one of the most eminent contemporary logicians, believed that brain is a calculating machine which is connected to soul and it is through this way that it acts differently. (13)

- In response to the argument that damage to head or using some drugs switches consciousness, it can be said that only physical signs of consciousness are absent. But these are absent during the sleep too, but in sleep dreams, which are some states of consciousness, can occur. Here, it can be said that the appearance of consciousness through regular channels has disappeared.
- We have evidences that the mental stales can lead to different body states. Deciding to raise our hard is enough to raise our hand, and the remembrance of food by a hungry person causes discharge of saliva.
- Some psychological problems prevent a person for doing some activities which are physiologically possible. The losing of sight due to some psychological events is a good example of this.
- Those who argue against the independence of soul from body, find their argument satisfactory. But, they ignore the fact that they are making a metaphysical assumption: To be real necessitates being material.
- The feeling of a physical state is the result of two factors, sensory perception and its interpretation. That there exists

an action of interpretation becomes obvious when we discover that it is not right.

- There is no paradox involved if we assume that a consciousness besides human body can exist.

(7) Kinds of Resurrection

There are various views about how resurrection occurs.

(a) Some scholars have said that resurrection is only for the body, because soul is a delicate substance that flows in the body, like oil in olive. Most of the Muslim theologians believed only in the resurrection of body.

The believers of this category can be classified into three groups:

- Some believe that the body dies and the same is resurrected.
- Some believe that the body dies and another body becomes alive.
- Some believe that a body's parts are dispersed and then it is gathered again.

Muhammad Bagher Majlesi, a well-known Shia scholar, believed only in the resurrection of the body and considered the Qur'anic verses and Islamic traditions explicit about it. (14).

(b) Most of Muslim philosophers believed in the resurrection of soul only. In their view, soul returns to the world of immaterials, and the rewards or punishment belongs to soul. What has come in the Qur'an and Islamic tradition, has been for the sake of making things understandable for the masses.

(c) Resurrection of body and soul

This is the view of some philosophers and theologians

(like Sheikh Mufid, Seyed Mortaza, Sheikh Tusi, Nasir al-Din Tusi and Mull-Sadra).

This group believe that the soul emerges with a body which is indistinguishable from the earthly body. But there is a difference of opinion about the body which appears there. Some scholars have said that it is the same body. Some of them have said that it is similar to the earthly body, and some believe that soul returns to an immaterial frame which bears the earthly attributes.

Illuminationist philosophers and Mystics believed that our universe consists of three kinds of beings:

Immaterials (having no matter and no quantity), sensibles (having both matter and quantity) and semi-materials (which belong to the world of platonic forms). The forms that we see during our sleeping belong to the last category. When somebody dies, his/her soul leaves his/her body, but in the resurrection the soul returns to a body completely similar to the earthly body.

Some scholars have appealed to the Qur'anic verses like:

> *«Is not he who created the heavens and the earth able to create the like of them.»(Yasin/81)*

to conclude that the body in the hereafter is similar to the earthly body, but it is not exactly the earthly one. Some scholars have argued that it is not necessary that a person›s body in the hereafter to be his earthly body, as the human personality is in his spirit, not his body. It is enough that each person's body in the hereafter to involve earthly materials, in such a way that if somebody sees it recognize it. Saint Paul believed that the body in the

hereafter is different from the earthly one.

About the return of soul to body, some scholars believe that it is upgraded and then joins the spirit. (15) **Mulla-Sadra**, believed that, in the hereafter, human soul creates a suitable body, with the person's characteristics, but is immaterial. (16) The appearance of that body is like the appearance of the earthly one. **Sabzèvari**, an eminent 19th century Iranian philosopher, believed that it is not necessary for the body in the hereafter to be the same as the earthly one, but it has to be similar to it, so that if somebody sees it, he/she recognizes it as the same person he/she had seen in the earthly life. (17)

(8) Resurrection from the view of Greek and Muslim philosophers

(a) Greek Philosophers

Plato believed that spirit has always existed and when a foetus becomes ready, the spirit joins the foetus, and after a person›s deat it returns to the initial condition. **Aristotle** believed that human spirit, although is different from other things, appears with the body and becomes mortal with body's death.

(b) Muslim Philosophers

The initial Muslim philosophers accepted Aristotle's view that spirit appears with the body, but they accepted Plato's view that the spirit remains after death. **Avecinna** considered imagination, senses, and memory to be material. But he considered the rational power to be immaterial, and that the spirit remains alive after somebody›s death

and is returned to God, and that rewards and punishments are rational. (18). **Avecinna** indicated, in some of his books that this is the conclusion we reach through rational arguments, but he accepted body's resurrection, as it was mentioned by the truthful prophet. (19)

Mulla – Sadra believed that matter in its development becomes spirit. He believed in body›s resurrection, but he considered the body after the resurrection to be formal one (in the platonic sense), which is generated by the spirit, and both joy and pain are soul's imagination. (20) Most of the later Muslim philosophers have not accepted Mulla Sadra's view about body resurrection in the hereafter. For example, Rafiee Qazvini (one of the contemporary Iranian philosophers) sees Sadra's view to be incompatible with the Qur'an and the Islamic tradition. (21) Imam Khomeini, too, disagreed with Sadra's view about body resurrection. (22)

Mutahhari believed that Sadra has not solved the problem, because first of all it is incompatible with what we understand from the Qur'an. Furthermore, the resurrection that the Qur'an talks about deals with the whole world, and not merely humans. When the Qur'an says: When the sun is wound up. (al – Takwir/1), It refers to the resurrection. (23) According to **Ayatullah Subhani**, Allamah Tabatabaei (The most eminent philosopher of the 20th century) did not believe in Mulla – Sadra's view about body›s resurrection. Furthermore, Tabatabaei most frequently abstained to teach about resurrection. (24)

In short, most of the late Muslim philosophers believe that

human spirit is resurrected with a body indistinguishable from the earthly one. Furthermore, they believe that the lack of understanding of the details of resurrection is not harmful to a person's faith.

The Qur'an and resurrection

In the Qur'anic view, death is the transfer of human spirit to another world, until it joins the body in the resurrection. The Qur›an considers human spirit as God›' grace, being beyond a material substance.

The Qur'ans arguments for the existence of resurrection is the following.

(a) Purposefulness of the Creation

Without resurrection, the evolutionary development of the universe becomes meaningless. If the human life ends in this world, without any conclusion to one's activities, his creation is futile. Thus, the Qur'an says:

> *"Did you suppose that We created you aimlessly, and that you will not be brought back to Us?" (al – Mu'minun/113)*

(b) God's ability to return the dead

In response to those who considered the resurrection of the dead to be impossible, the Qur'an says:

> *"Is not He who created the heavens and the earth able to create the like of them." (Yasin / 81)*

In winters we don't see vital traces of the plants. But after the rains, they gradually start activity and we see their vitality. According to the Qur'an:

"Allah sends down water from the sky with which He revives the earth after its death" (Al–Nabe/65)

(c) God's justice

If there is no hereafter, there would not be any difference, e. g., between a theist and an atheist:

"Shall we treat those who have faith and do righteous deeds like those who cause corruption on the earth? Shall we treat the God-wary like the vicious?" (Sad /28)

(d) The immateriality of human soul

"Do not suppose those who were slain in the way of Allah to be dead; rather they are living and provided for near their Lord" (Al-I Imran / 169). "Allah takes the souls at the time of their death, and those who have not died in their sleep. Then We retain those for whom He has ordained death and release the others until a certified time." (Al – Zumar / 42)

This verse indicates that God takes something from humans at their death or when they are in sleep.

The Qur'an's responses to challenges about resurrection.

(a) Whoever is capable of creating the heavens and the earth can revive the dead:

"Do they not see that Allah, who created the heavens and the earth and [Who] was not exhausted by their creation, is able to revive the dead?" (al-Ahqaf/33)

(b) The one Who created first, can do it again:

"Say, 'He will revive them Who produced them the first time, and He has knowledge of all creation.›" (Yasin / 79)

Resurrection in the Old Testament and the New Testament

In the **Old Testament**, human death is not considered as the end of physical life (Genesis 2:7; 3:19), but the dead continues to exist through the spirit (Psalm 104:29; Ecclesiastes 12:7).

More explicitly:

«The Lord brings death and makes alive; he brings down to the Grave and raises up» (1 Samuel 2:6)

«Multitudes who sleep in the dust of the earth will awake; some to everlasting life, others to shame and everlasting contempt.» (Daniel 12:2)

In the **New Testament**, too, we see references to hereafter:

«But I tell you that everyone will have to give account on the day of judgment for every empty word they have spoken.» (Mathew: 12:36)

and:

«Do not marvel at this; for an hour is coming, in which all who are in the tombs will hear His voice, and will come forth; those who did the good deeds to a resurrection of life, those who committed the evil deeds to a resurrection of judgment.» (John: 28-29)

In the four books of the New Testament, there are many verses that indicate the revival of both body and spirit,

and there are also references to both heaven and hell.

Difficulties in understanding the way resurrection takes place

There is a unanimous view among all Muslims that there is a resurrection, with an eternal life in the hereafter. But the Qur'an says explicitly that the whole knowledge about the hereafter is that of God:

> *"They Question you concerning the Hour; when it will set in. Say, 'Its knowledge is only with my Lord: none except Him shall manifest it at its time ..." (Al – Araf / 187).*

Some eminent Muslim philosophers have admitted the difficulty of understanding some aspects of resurrection. In the words of **Ibn Rushd** (one of the eminent Muslim philosophers):

> *"It is necessary that humans accept the possibility of Resurrection, and that it certainly occurs. But [about] the way it happens, whether it is for body or spirit or both, one can believe any way, provided his endeavour is not lead to the denial of resurrection itself." (25)*

And According to **Mutahhari**:

> *"To use the Qur'an's terminology, we should have faith, and even more, certainty about resurrection. But the problem of resurrection is so difficult and complex that many [scholars] believe that as far as resurrection is concerned, we have no choice but devotion and submission." (26)*

Sources

(1) Miller Jr., Fred D .and Biondi, Carrie-Ann, eds., A Treatise on Legal Philosophy and General Jurisprudence (Springer,2007), p. 304.

(2) Wang, Hao, A Logical Journey: Gödel to Philosophy (MIT Press, 2016), P. 105.

(3) Mulla-Sadra, al-Hikmah al-Muta›aliyah fi al-Asfar al-›Aqliyya al-Arba›ah , Vol. 3(Beirut: Dar Ihya al-Turath al-Arabi, 1404 H.Q.), p.367.

(4)Avecinna,ash-Shifa›:al-Ilahiyyat(Qum:Mara›shi Library, 1404H.Q.),p.8

(5) Crick, Francis, The Astonishing Hypothesis: The scientific search for soul (New York: Charles Scribner's Sons, 1994) P.3.

(6) Bohr, Niels, "Light and Life ", Nature, 1933,131, p.458.

(7)Schrodinger, Erwin, "General Scientific and Popular Papers," in Collected Papers, Vol.4 (Vienna: Austrian Academy of Sciences, 1984), p. 334.

(8) Planck, M., as cited in de Purucker, Gottfried, 1940. The Esoteric Tradition (California: Theosophical University Press1940) ,Ch. 13.

(9) Eccles, John, Evolution of the Brain: Creation of the Self (London: Taylor & Francis,2005), p. 249.

(10) Mott, Neville, Can Scientists Believe (London: James & James Science Publishers Ltd.,1991), p.8.14.

(11) Horgan, John, «World›s smartest physicist› believes consciousness will remain unsolvable», Scientific American, August 19, 2016, p. 38.

(12) Varghese, Roy Abraham, there is Life After Death: Compelling Reports from Those Who Have Glimpsed the After-Life ((New Page Books, 2010).

(13) Wang, Hao, A Logical Journey, p.193.

(14) Majlesi, Muhammad Baqir, Bihar al-Anwar, Vol. 7 (Beirut: Dar Ihya al-Turath al-Arabi, 1403 H.Q.), p.47.

(15) Mutahhari, Mortaza , Collected Works , Vol. 4 (Sadra Publications, 1995), p.751.

(16) Mulla Sadra , al-Mabda› wa›l-ma›ad (Qum : Intesharat Daftar Tabliqat Islami, 2001) pp. 460-461.

(17) Sabzevari, Mulla Hadi, Asrar al-Hekam (Tehran: Islamiyah Publications, 1351 H. Q.) ,p. 343.

(18) Avecinna , al-Nejat (Tehran: Tehran University Publications,, 1985),

pp. 345-350.

(19) Ibid., p. 682.

(20) Mulla-Sadra, al-Hikmah al-Muta›aliyah fi al-Asfar al-›Aqliyya al-Arba›ah ,Vol. 9, p.200.

(21) Rafiei Qazvini, Abulhasan, Collected Treatises and Articles, ed. by Qulamhosein Rezanezhad (al-Zahra Publications, 1988), p. 83.

(22) Khomeini, Ruhullah, Imam Khomeini›s View About Resurrection (Tehran: Moa›ssesah Tanzim wa Nahr Athar Imam Khomeini, 2003), p. 107.

(23) Mutahhari, Mortaza , Collected Works , Vol. 4, p. 24.

(24) « Interview with Ayatullah Subhani», Keyhan Farhangi , Sixth year, No. 8, Aban 1368 (1989).

(25) Quoted in Some prominent Lines from Islamic Philosophy and Theology, by Muhammad Javad Muqniah (Mashhad: Astan Quds Razavi Publications, 1985), p. 178.

(26) Mutahhari, Mortaza, Collected Works, Vol. 4, p. 662.

| CHAPTER THIRTEEN |

VALUES AND ETHICAL ISSUES IN SCIENCE AND TECHNOLOGY: A MUSLIM PERSPECTIVE

Introduction

There have been phenomenal advancements in science and technology in the last two centuries. Modern medicine has eliminated many of the diseases; modern transportation has led to the possibility of saving the victims of earthquakes and famine on a large scale and modern communication has eased the problem of getting in contact with the remotest regions in the world. But, on the other hand, since the age of dinosaurs, human beings have produced the worst possible kinds of destructions during the last hundred years. Many of the species have disappeared, the Ozon layer has been depleted, and the largest number of killings have occurred in the regional and world wars. In short, some natural forces have been used for dominance over nations and individuals and the most efficient means of mass destruction has been devised. Furthermore, in our era, the strengthening of economic and political base has become the main justification for investment in science.

Now, the question arises as to why the advancement of science and technology has not led to the well-being of humanity? Why is the manufacturing of deadly weapons

and the pollution of the environment threatening human existence in a rapidly growing fashion? We share the view of many sages in the East and the West that the whole problem has developed from a change in attitude toward science that took place after the Renaissance. This change, to paraphrase E. F. Schumacher, was from what he called 'science for understanding' to 'science for manipulation'. The first outlook was based on wisdom and had a moral code. The latter view was directed towards material power through the exploitation and manipulation of nature. The old science had the goal of discovering the secrets of God's handiwork in nature, whereas the new science saw nature as a quarry to be exploited. In **Schumacher's** words:

> *"The 'science for understanding' saw man as made in the image of God, the crowning glory of creation, and hence 'in charge' of the world, because noblesse obliges. The 'science for manipulation', inevitably, sees man as nothing but an accidental product of evolution, a higher animal, a social animal, and an object for study by the same methods by which other phenomena of this world were to be studied – 'objectively'." (1)*

The weakening of moral values and ethical considerations in the scientific enterprise in the last two centuries, especially during the twentieth century, has had many causes. Here, we summarize briefly the most important factors.

(i) The mechanistic view of nature in the 17th and 18th centuries, which viewed nature as a machine with

no inherent rights or interests, led to an exploitive attitude toward nature.

(ii) Before the development of modern science, most of the scientists believed in objective moral laws. The progress of science has been effective in marginalizing ethical considerations and spreading around the subjectivism of moral values. This, in turn, has led to moral relativism.

(iii) Some popular scientific theories, such as Darwin's theory of evolution, have undermined the belief in an objective moral order.

(iv) Prior to the Renaissance, science, religion and philosophy were intimately related to each other. The growth of specialization led to the isolation of science from other areas of human knowledge and concern: As **Toulmin** put it:

> *"It was the development of specialization and professionali- zation that was responsible for excluding ethical issues from the foundations of science." (2)*

(v) The wide belief among scientists about the absolute separation of facts and values has undermined the role of ethics in the scientific enterprise. Since Hume's time, it is usually argued that science is an objective value-free enterprise dealing with facts, where as values are subjective, depending on personal opinion. In **Popper's** words:

> *"To sum up, it is impossible to derive a sentence stating a norm or a decision, or say a proposal from a policy from a sentence stating a fact; this*

is only another way of saying that it is impossible to derive norms or decisions or proposals from facts." (3)

This view ignores the fact that the separation of facts and values is itself a value-based decision.

In most of the world's religions the concept of moral law is related to the goal toward which the world is heading for, and the rightness of any human activity is determined on the basis of its accord with that goal. In a world free of a telos, values have no reference frame and are only temporary means for handling human affairs. The real ground for moral conduct is the belief in a universe which has an underlying purpose and moral order.

The neglect of teleology in modern science has been effective in dispensing with moral values in the scientific enterprise.

(vi) The Prevalence of moral relativism in our time has weakened the belief in moral values. Moral relativists claim that all moral values are of equal worth, because they are conventions made by a community in order to regulate its affairs. In this view the standards of rationality and moral codes are culture-dependent.

Moral relativism is not compatible with a truly religious perspective of the cosmos. Furthermore, the absence of common moral basis in discussions or decisions leaves all such matters without any conclusion and only force can be the arbiter. As **Polkinghorne** elegantly put it:

"If there is no common ground on which the disputants can meet, then the only strategy left is to try to shout louder than the rest." (4)

(vii) All religions of the world advocate some standards of conduct. They all prescribe some common moral principles in spite of their differences in theological issues. Furthermore, all religions of the world have a key role in the ethical education of the public. The weakening of the religious authority.

In the last two centuries has been effective in reducing the role of moral values in all spheres of human concern, including the scientific enterprise.

(I) The Relation of Science and Ethics

Science deals with the study of nature through experimentation, observation and intellectual work. Ethics, in the sense we use here, concerns rules of conduct – the so-called moral values.

A fundamental question is whether these two spheres of human concern are independent of each other or are related, and in the latter case, what the nature of their relation is? At first glance, they seem to be independent; one is dealing with "facts" and the other one is related to "oughts". This is, in fact, what Hume preached and since then has been increasingly favored by some western philosophers and intellectuals.

We admit that on the logical basis alone one cannot derive normative statements from factual statements. Nevertheless, we believe that scientists cannot ignore ethical issues, and science and ethics are related both at the metaphysical level and at the practical level. Thus, the claim for moral neutrality in scientific research and its

applications is simply an illusion.

(a) The Relation of Science and Ethics at the Metaphysical Level

Science deals with a very important aspect of human life, but it cannot deal with the whole spectrum of human experience. To deal with this wider spectrum, one needs an enlarged view of science, a metaphysics, which includes both science and ethics, among other things, and which can handle all aspects of human experience in a unified manner. Usually, the values that shape people's interaction with nature come from religious world views. In the words of **Lynn White**:

> *"What people do about their ecology depends on what they think about themselves in relation to things around them. Human ecology is deeply conditioned by beliefs about our nature and destiny – that is, by religion." (5)*

(b) The Relation of Science and Ethics at the Practical Level

At the practical level, science and ethics are related for the following reasons:

(i) Science is a goal-directed enterprise. Thus, it must include some kinds of values that give direction to both its goals and the means of achieving them. For example, commitment to truth is a value which is essential to the enterprise of science. In the words of **Karl Popper**:

> *"The fact that science cannot make any pronouncement about ethical principles has been misinterpreted as indicating that there are no such principles, while in fact the search for truth*

presupposes ethics." (6)

Furthermore, science is an important means for obtaining socially-valued goals like knowledge and power.

(ii) The whole scientific enterprise involves value-judgements. Here, we mention several important categories:

-There are some codes of conduct in the practice of science which function as a quality control mechanism and ensure people's trust in science– ethical codes like honesty, openness, impartiality and integrity. There is a consensus in the scientific community about the necessity of this kind of ethical codes (moral values).

-Value-judgements permeate scientific practice at the level of discovery. For example, they can affect a scientist's line of research.

-Value-judgements play a very important role in the assessment and choice of theories. Because, the appraisal of scientific theories is done on the basis of certain criteria which are value-laden. **Thomas Kuhn** counts the following as the characteristics of a good scientific theory: predictive accuracy, internal and external consistency, broadness of scope, simplicity (unifying power) and fruitfulness. (7) One could add other criteria such as social utility and beauty. These criteria, as **Kuhn** and McMullin emphasized, operate as values – "epistemic values" in McMullin's terminology. (8) As **Kuhn** put it:

> *"The criteria of choice function not as rules, which determine choice, but as values which influence it. Two men deeply committed to the same values, may nevertheless, in particular situations, make*

different choices, as in fact they do." (9)

Thus, e.g., the disagreement between Einstein and Bohr about quantum theory was rooted in the fact that they had different views about what a "good" theory is expected to accomplish.

-Value-judgements enter into decision making concerning the applications of science and technology. Scientific discoveries and technological innovations often lead to important social, moral and political consequences. Thus, as a member of a society, a scientist should not ignore the consequences of his or her research or teaching.

The destructive consequences of science and technology during the last century was the result of the separation of facts from values and the indifference of some scientists towards the ethical and social consequences of their scientific findings or technological innovations. The manufacturing of chemical/biological and nuclear weapons could be cited as an example.

The progress of science during the last century has raised serious ethical issues about experiments involving human or animal subjects or public safety.

To humanize applied science and technology, one needs to take into account ethical considerations, especially when one is dealing with the kind of research that affects humankind or the environment. This is because scientific and technological progress cannot, by itself, hold the societies intact. This is accomplished only through giving proper weight to moral principles.

(iii) Science has become increasingly interlocked

with business, industry and political goals. This can lead to moral conflicts between proper scientific goals and business values or government priorities, which are economic or power oriented.

(iv) Those who preach the value-neutrality of science confuse the findings of science with its applications. Science is a double-edged sword. It could be used to secure human welfare or it could be used for destructive purposes.

(v) To secure human welfare in all human activities, including scientific work, there has to be a sense of responsibility in those involved. Science cannot provide this. The moral responsibility comes from elsewhere, e.g. religious belief.

(II) The Urgent Need for Ethical Concern in Our Age

In our era, there are two main considerations in the pursuit of science": 'science for the sake of science' and 'science for material goals and power'. This dominant materialistic outlook, which reduces everything to the level of matter and labels anything beyond science as non-scientific, views the universe as a cosmic accident, lacking any meaning and purpose. But the development of science and technology for its own sake and free of its impact on society and environment, has generated a real crisis for the human race.

Indeed, the recent advances in molecular biology and genetic engineering has produced an unprecedented increase in human power over living things. The root of this crisis lies in the prevalent secular interpretation of human

status in the cosmos, in the assumed relation of humankind with the rest of the creation and in the separation of facts from values, i.e. knowledge from the codes of conduct. Thus, it is very important that science be put within a broader framework, an underlying metaphysics, that takes all aspects of human concern into account. This includes the relation of humankind to God and to the cosmos, and, in turn, brings up the issue of wisdom and moral values, and implies that there has to be an ethical orientation to the scientific activity.

Then, science and technology will be at the service of humankind's integral development.

The ethical issues raised by recent advances in technology are of various kinds. Here, for the sake of brevity, we consider only two important categories.

(a) Genetic Manipulations

Experiments on generic engineering, studies on the genetic origin of intelligence, and the cloning of human embryos and animals have brought up the question of redesigning human beings. These new developments have the following characteristics:

• They are double-edged, i.e. they could be used to treat some diseases or they could be used to produce biological weapons or change human characteristics or they could be used to disrupt the delicate balance of our planet's whole eco-system.

• There is not enough information about the possible consequences of the new discoveries.

While biotechnology could offer exceptional potential

benefits for medicine and agriculture, serious questions are being raised for new reproductive technologies. Thus, all experiments should be done with extreme caution, and one has to refrain from conducting experiments that can raise serious ethical concerns. For example, as far as the problem of human cloning is concerned, some serious questions have been raised in both the religious and the secular circles. We just sample a few of the objections raised against human cloning in some Christian and Muslim circles:

- Cloning destroys the dignity, uniqueness and sacredness of human life, i.e. it leads to dehumanization.
- Cloning reduces human body to the level of a merchandize.
- Cloning affects the family system and would lead to legal and ethical dilemmas.
- Cloning leads to the loss of kinship.
- Cloning could lead to some unpredictable incurable problems.

Some religious people have rejected human cloning on the ground of its artificiality. But, in our view, it is the dignity of the human person which is involved.

(b) Environmental Crisis

The industrialization of the west in the nineteenth and twentieth centuries has resulted in the degradation of our environment, overexploitation of the earth's resources, extinction of many species, air and water pollution, military proliferation, toxic surplus, among other things. This environmental crisis has been the result of a drive

for unlimited economic growth and has been perpetuated by the materialism and secularism of the industrialized societies which view nature as a commodity to be exploited. This environmental crisis threatens the existence of all life-forms on our planet, including humankind.

If the processes of technological development continue unchecked, there is no hope for humanity in the future. To reverse the present trend, there has to be a concerted effort on the part of governments word-wide, the scientific establishment and religious authorities. But, this is not going to succeed without adding the moral dimension to the present relation between human beings and their environment. As **Anthony Giddens** put it:

> *"Not just the external impact, but also the logic of unfettered scientific and technological development will have to be confronted if serious and irreversible harm is to be avoided. The humanizing of technology is likely to involve the increasing introduction of moral issues into the now largely "instrumental" relation between human beings and the created environment." (10)*

This implies that what is technically possible is not necessarily morallyadmissible.

(III) The Importance of Moral Dimension in the Islamic Outlook

In the Islamic outlook, science and ethics are synthesized within the underlying Islamic world-view which considers the phenomena of nature as signs of God, attributes a

telos to the universe and assumes a moral character for the cosmos.

According to the Qu'ran, God gave humankind the ability to grasp nature:

> *"And He taught Adam all the names ...." (2: 31)*

and granted to human beings the role of His vicegerency on the earth:

> *"It is He Who has appointed you vicegerents in the earth, and has raised some of you in ranks above others, that He may try you in what He has given you, swift is your Lord in retribution ..." (6: 165)*

and honored them:

> *"And surely we have honored the children of Adam..." (17: 70)*

which means that they are God's dignified trustees on the earth. This was accompanied by three things:

(i) Humankind's ability to use natural resources

By giving to humankind the ability to gain the knowledge of the secrets of nature, God gave human beings the power to take advantage of **nature's resources**:

"Do you not see that Allah has made what is in the heavens and what is in the earth subservient to you, and made complete to you his favors outwardly and inwardly? ..." (31:20)

(ii) Humankind's responsibility

As a trustee of God, each person must act responsibly:

"So, by our Lord, we would certainly question them all, as to what they did." (15: 92,93)

Thus, mankind is supposed to take care of the earth, in accordance with the purposes prescribed by God, discharging his duties with sincerity and justice and avoiding any kind of mischief in the earth:

"And do not make any mischief in the earth after its reformation, and call on Him, fearing and hoping." (7: 56)

This includes destruction of individuals, extinction of species, abuses of the natural resources, pollution of the environment, etc. Thus, e.g., the killing of one person is counted in the Quran as the killing of all people:

"That was why we laid down for the children of Israel that whoever killed a human being, except as a punishment for murder or for sedition in the earth, should be looked upon as though he had killed all mankind..." (5: 32)

This stresses the sanctity of human life as it is a gift from God. The responsibility implied by trusteeship has the following dimensions:

- Responsibility towards one's actions:

"This is the day for sorting things out which you have been denying... Stop them! They must be questioned" (37: 21-24)

- Responsibility towards other members of the society:

"They believe in God and the last day; they command

decency and forbid dishonor; and compete in doing good deeds. Those are honorable people" (3: 114)

and in the **Prophet's** words:

"Verily, each one of you is a guardian (shepherd) and each guardian (shepherd) is responsible for his subjects (flock)" (11)

- Responsibility towards animals and other creatures:

"There is no animal crawling on the earth, nor a bird flying with its wings, but they are communities like you" (6: 38)

and as the **Prophet Muhammad** (SA) said:

"All creatures are God's family (dependents); and God loves the most those who are the most beneficent to His family (dependents)" (12)

and in words of **Imam Ali** (AS):

"Fear God about His servants and His cities, because you will be questioned even about lands and beasts". (13)

(iii) Humankind's knowledge of good and evil

According to the Quran, God created human beings in good proportion and with suitable potentialities and inspired to them the right and wrong:

"Have we not given him two eyes; a tongue and two lips; and shown him the two highways (of the good and the evil)?" (90: 8-10)

and

"And by the soul and Him who shaped it and inspired it with (the knowledge) of the right and

wrong." (91: 8-9)

(IV) Moral Orientation of Science and Technology in Islam

As far as the ethical dimension of science is concerned there are four concepts in the Quran and the Islamic tradition which are specifically relevant to the moral orientation of science and technology. These are the concepts of "useful knowledge", "balance", "purification of soul" and "avoiding unfounded judgements".

(1) Useful knowledge

Whereas the acquisition of knowledge, in its generic sense, is strongly recommended in Islam, it is emphasized that one has to seek useful knowledge. In the **Prophet's** words:

> *"My Lord, save me from any knowledge which is useless" (14)*

Any knowledge which helps humankind in performing his God-assigned role in the world is considered to be useful; other than that is categorized as useless knowledge. Thus, any branch of knowledge whose harm is greater than its benefit is to be avoided. **Imam Sadiq** (AS) has elaborated on this point:

> *"Any sort of science and technology which eliminates man's needs or is useful to God's servants and helps them to continue their lives and meet their needs, is permitted by religion to teach or to learn.... Anything causing disturbance or harm, or ending in corruption and having no use for man, is forbidden to teach, to learn or to impart it to others ..." (15)*

(2) Balance in the Cosmos and in All Human Action

According to the Quran, everything, in the created universe, is orderly and balanced (measured and in proportion), and humankind is not supposed to disrupt this balance. We must act in concordance with the order of the balanced cosmos:

> *"The sun and the moon pursue their ordered course ... He raised the Heaven and set the balance. That you might not transgress the balance." (55: 5-8)*

Thus, from the fact that the cosmos is an orderly and balanced, it is concluded that humankind should not transgress the balance in his relation with him-self and with the rest of the creation. In other words, the laws governing the cosmos, should be harmonious with the ones ruling over human affairs as they all refer to the same God and God wants to keep everything balanced in the cosmos.

Another idea used in the Quran in connection with the concept of 'balance' is the concept of "moderation". It is recommended that in satisfying one's legitimate needs, one is not supposed to consume or acquire **beyond one's real needs**:

> *"And those [are servants of God] who when they spend, are neither wasteful nor niggardly, and there is a just mean between those [extremes]." (25: 67)*

Thus, the excessive use of natural resources is to be avoided.

(3) Purification of soul

In the Quranic outlook, the message of God's apostles has been two-fold: to teach the faith and to purify people:

> *"Our Lord! and raise up in them an Apostle from among them an Apostle from among them who shall recite to them Your communications and teach them Book and the wisdom, and purify them ..." (2: 129)*

Thus, the pursuit of knowledge has to be accompanied by the teaching of moral values. The assumption of the character traits of God gives a correct orientation to one's scientific activity.

(4) Avoidance of unfounded judgements

One of the important points emphasized in the Quran is the avoidance of unfounded confirmations and rejections:

> *"And follow not that of which you have not knowledge; surely the hearing and the sight and the heart, all of this shall be questioned about that." (17: 36)*

This is especially important for our era, where many experiments are being done for which possible risks are not known yet.

Some scholars have attacked the monotheistic religions on the ground of being responsible for the present environmental crisis.(16) In their view, the monotheistic religions see no reason for the existence of nature save to serve humankind and their otherworldly inclinations encourage the neglect of the environment. But, the fact is that neither Judeo – Christian tradition nor Islam permit

the spoliation of the earth or its resources, i.e. utilitarian attitude, and the negligence of humankind's role in flourishing the present world.

In summary, in Islam, as well as other Abrahamic religions, human beings are God's vicegerents on the earth, and they are responsible for its prosperity and they are responsible toward each other. Nature is to be dealt with as sacred, rather than exploited. The principle of balance and moderation is central to Islamic outlook. Furthermore, Islam extends the sphere of ethical concern to all creation. For Muslim scientists and technologists, the Islamic world view should give orientation to the applications of science and technology and scientific activity must fulfil the requirements of human societies and it should prevent scientists from contributing to anything that is harmful to the safety of human beings and their environments.

For the case of genetic manipulation of human beings, the following are unlawful in Islam:

- Producing children through channels other than marriage
- Disrupting the family system
- Manipulating human genes before knowing the ethical, social and biological consequences of this research
- Harming human dignity

As far as the environmental ethics is concerned, the Islamic view is based on a harmony between mankind as God's trustee in the earth and nature as a manifestation of God's handiwork. This necessitates the protection of the natural environment from abuse and the safeguarding of other creatures of God.

Conclusion

In the past, ethical considerations were a concern of all faithful scientists, both in the Islamic world and in the Western world. This perspective has been dramatically changed in our era.

The development of science and technology under the secularist-materialist worldview has led to grave consequences for humankind. In this worldview, the ethical, philosophical and religious dimensions of science and technology are neglected and humankind's physical comfort is confused with real happiness, though even this one is not achieved. The industrial world with all its technological superiority is crying out for meaning and purpose–things that scientific and technological advances have not provided for humankind.

There is no doubt that the environmental crisis and the possibility of improper genetic manipulation of some natural processes is a treat to the very existence of human life and human societies. To ensure normal human life, it is urgent today that some steps to be taken to save human race from this catastrophe. We have the following recommendations:

(i) The source of all problems that threaten the very existence of humankind and its ecosystems lies in the short-sighted worldview and epistemology that governs the present science and technology and in the interpretation of modern humanity of his position and responsibility in the cosmos. The present trend of restricting knowledge to the scientific investigation of nature has to be replaced

by one that embeds science within a richer framework which includes other dimensions of human experience, including spiritual and moral ones – a world-view that relates man's life to the rest of the universe.

(ii) Scientists' training should be accompanied by ethical education in order to stimulate moral concern. This could most effectively be done in a religious context. An ethics without religious basis could exist, but a religiously-based ethics has the advantage that religion can provide justification, interpretation and definitions of moral values. Furthermore, religious value systems are useful for mobilizing people for preserving the environment.

(iii) Scientists should seriously refrain from conducting any kind of research which could be harmful to the human life, other creatures and our environment. Thus, e.g., germ line gene manipulation, which has raised the prospect of altering human genetic machinery and could disrupt the metabolic balance of the individual, requires extraordinary caution and should not proceed irresponsibly.

(iv) The nation-states have shown their incompetence in combating environmental crisis and in preventing harmful applications of science and technology. The moral authority of religion is one of the best ways of securing moral concern in the individuals and in societies.

(v) In all three monotheistic religions humankind is part of a wider cosmic order. This means that plans for scientific progress and technological innovations are supposed to be harmonious with this cosmic order. Thus, the scientists committed to these religions, as well as other

people of good will, should address the moral dilemmas created by the abuses of science and technology and by the present environmental crisis and should devise a joint strategy based on some core religious values. **John Polkinghorne** has put the matter nicely:

> *"It is essential that Christians and other religious people should seek what common ground they find with all other people of good will in trying to articulate an ethical basis for caring for our world. Perhaps that common ground can be found in the acknowledgement of a respect for all humanity and for life and for the world that gave us birth. We need a sharp concept of the common good, wide enough to embrace the natural world and future generations." (17)*

I think this is feasible and it is the only hope for the survival of human race on this planet.

Sources

(1) E. F. Schumacher, A Guide for the Perplexed (London: Janathan Cape, 1977), 65.

(2) M. Artigas, The Mind of the Universe (Philadelphia: Templeton Foundation Press, 2000), 258.

(3) K. R. Popper, The Open Society and Its Enemies, Vol. 1 (Princeton: Princeton University Press, 1971), 64.

(4) J. Polkinghorne, Beyond Science (Cambridge: Cambridge University Press, 1996), 124.

(5) L. White, "The Historical Roots of Ecologic Crisis," Science, 155, 1967, 1205.

(6) K. R. Popper, "Natural Selection and the Emergence of Mind," in Evolutionary Epistemology, Rationality and the Sociology of Knowledge, ed. Gerard Radnitzky & William W. Bartley, III (La Salle, Ill.: Open Court, 1987), 141.

(7) T. Kuhn, "Objectivity, Value-judgement and Theory Choice," in The Essential Tension (Chicago: University of Chicago Press, 1977), 321-322.

(8) E. MacMullin, "Values in Science," in Proceedings of the 1982 Biennial Meeting of the Philosophy of Science Association, ed. By P. D. Asquith & T. Nickles (East Lansing, Michigan: Philosophy of Science Association, 1983), 14-20.

(9) T. Kuhn, op. cit., 331.

(10) A. Giddens, The Consequences of Modernity (Stanford: Stanford University Press, 1990), 150.

(11) Muslim Ibn al-Hajjaj, Sahih Muslim, Vol. 3, # 1829 (Beirut: Dar Ihya al-Turath al-Arabi, 1955), 1459.

(12) Jalal al-Din 'Abd al-Rahman ibn Abi Bakr al-Suyuti, J., al-Jami' al-Saghir min Hadith al-Bashir al-Nazir, Vol. 1 (Damascus: maktabah al-Halis, int. n.d.), 358.

(13) Imam Ali, Nahjul Balagha, ed. By S. al-Saleh (Beirut, 1967), 242.

(14) Suyuti, J., op. cit., Vol. 1, P. 185. The same tradition has been narrated by M. H. Maghsi, though with a slightly different wording. M. B. Maghsi, Bihar al-Anwar, Vol. 2 (Beirut: Dar Ihya al-Turath al-Arabi, 1983), P. 33.

(15) Harrani, Tuhaf al-'Uqoul on Al-e al-Rasoul (Qum: Daftar-e Intesharat-e Islami, 1363S.), PP. 335-336.

(16) A. Toynbee, "The Religious Background of the Present Environmental Crisis", in Ecology and Religion in History, ed. By D. and E. Spring (New York, 1974); L. White, op. cit.

(17). J. Polkinghorne, op. cit., 124-125.

| CHAPTER FOURTEEN |

The Role of Metaphysics, As a Bridge Between Science and Religion

I-Relevance of Metaphysics to Science

Originally, philosophy covered the entire field of human knowledge, except technical percepts and practical arts, and it was divided into two main parts:

1. Theoretical Philosophy, consisting of physics (or natural philosophy), mathematics, and metaphysics.
2. Practical Philosophy, related to conduct and the rules of conduct.

Thus, science in its modern sense, did not exist as a separate department, and some of the greatest philosophers were distinguished scientists, and even those who were mainly involved in the so-called "physical sciences" tried to accommodate their findings within some philosophical framework. With the advancement of science and technology, sciences abandoned philosophy and went their own ways. **Helmholtz** describes the situation in 1862 as follows:

> *The philosophers accused the scientific men of narrowness; the scientific men retorted that the philosophers were crazy. And so it came about that men of science began to lay some stress on the banishment of all philosophic influences from*

their work; while some of them including men of the greatest acuteness, went so far as to condemn philosophy altogether; not merely as useless but as mischievous dreaming . (1)

Philosophy is sometimes used in the sense of metaphysics i.e. that department of knowledge that deals with the most basic problems of existence, including such concepts as being, substance, space, time, cause, effect etc. Here, we use philosophy in this sense.

Under the influence of positivism and allied trends, much of twentieth century English-speaking philosophy has reduced the job of philosophy to the analysis of concepts. The empiricists' spirit, which has dominated contemporary scientists, has taken away the old tradition of trying to extract philosophical implications of one's work, and has replaced it by pragmatism, instrumentalism, etc.

From the early decades of the twentieth century on, philosophy (in the sense of metaphysics) lost its appeal among scientists, and its domain has become very much limited. Thus, most of the contemporary scientists do not pay attention to the philosophical implications of their work, and some of them even consider such activities to be a waste of time. Today, the fashion among theoretical physicists is to give only a description of one's scientific findings, without any concern about its philosophical implications. Also, the aim of scientific research is taken to be the correlation of natural phenomena, prediction and new discoveries. The idea of harmonizing one's manifold of experiences has lost its appeal. The myth of metaphysical neutrality of science and

the strong emphasis on predictability and practical applications of science has led to a strong emphasis on science and technology and the lack of appetite for the real understanding of nature. This one-dimensionality of scientists ,i.e. dealing only with one's specialty, is a real threat to the future of science, and may cause a serious decline in our deep understanding of nature.

There are several reasons for the decay of physicists' explicit allegiance to the scientific-philosophic tradition. Here, we only mention the most important ones.

(a)The Complexity of Philosophical Problems

The difficulty of understanding and solving the basic metaphysical problems on the one hand and the disagreement of philosophers in handling these problems on the other hand, has been a major factor for the dismissal of philosophical concern. But despite the difficulty of metaphysical problems and in spite of the vast differences between various philosophical schools, metaphysics is indispensable to our understanding of the world. The immense difficulty of metaphysical problems does not imply that they have to be erased. Rather, it means that due to the wide scope of metaphysical issues, much more effort is needed to handle them. The disregard of metaphysics simply prevents the harmonization of one's ideas. In **H. Weyl's** words:

> *In spite of the fact that the views of philosophy sway from one system to another, we can not dispense with it unless we are to convert knowledge into a meaningless chaos. (2)*

(b)The Success of Physical Theories

The spectacular success of some theories (like quantum mechanics) in accounting for a vast domain of phenomena has led many physicists to be satisfied with experimentation and the available mathematical formalism.

(c)The Excessive Interest in Specialization

The rapid advancement of science and the development of various branches within each scientific discipline, has led scientists to get involved more and more with their special department of research, to neglect unifying ideas, and to pay less attention to a comprehensive view of physics as a whole. **Heisenberg**, commenting on this point, writes:

> *It is evident from this discussion that narrow specialization is a hindrance for understanding. It is only by looking at the whole field of new phenomena that the correct concepts can be found. Even in a very special problem, understanding can frequently be obtained by referring to a similar problem and its solution in a different field of physics .(3)*

(d)The Philosophers' Disinterest in Scientific Disciplines

Many of the contemporary philosophers are not well-versed in physical sciences. Rather, they are mostly concerned with the analysis of language and related subjects. Thus, their work has had little impact on scientists. That is why **Bertrand Russell** warned philosophers that the lack of concern for the problems of modern science makes their

activities futile:

> *I do not think that the work of our century in either relativity or quantum theory has had any very good influence upon philosophy, but I regard this as the fault of the philosophers, who, for the most part, have not thought it necessary to master modern physics. I hope that an increasing proportion of philosophers will, as time goes on, become aware that ignorance of physics condemns any philosophy to futility .(4)*

(e)The Philosopher's Cold Reception of Physicists' Philosophical Views

Philosophical views of quantum physicists encountered disapproval of some philosophers. This, in turn, distracted physicists' attention from philosophical problems. Thus, Bohr, in an interview with Thomas Kuhn, complained that philosophers had not understood his "complementary description".

(f)The Association of Metaphysics with Religion

From the end of seventeenth century onward, science became increasingly separated from religion. On the other hand, people associated religion with metaphysics. Thus, they extended their distaste for religion to their distaste for metaphysics. This attitude has continued to this day.

(g) The Prevalence of Empiricism

In my view, this is the main cause for the dismissal of philosophical speculations. The doctrine of empiricism,

that the senses are the only sources of knowledge, had its roots in Greek and medieval philosophy. But, it gained popularity with the works of the British empiricists of the seventeenth and eighteenth centuries. According to this doctrine all of our knowledge about the physical universe is derived from sense experience. Thus, metaphysical concepts should be excised from any physical theory, as they are not rooted in sense experience. In the twentieth century, empiricism took the form of a doctrine of meaning, asserting that a word or sentence is meaningful only if rules involving sense experience can be given for its application or verification. The doctrine of positivism, operationalism , pragmatism and similar trends are different species of empiricism. The common feature of all these doctrines is that they give primacy to sense experience and reject metaphysics

Here, instead of going into other versions of empiricism, we shall summarize the most important claims of contemporary empiricists:

• Metaphysical assertions are neither scientific nor philosophical. The sole task philosophy is to analyze the language of science.

• All knowledge comes from experience, which is itself a succession of sense-data. Thus, all statements about the world are really statements about such experiences (phenomena), and there is no unknowable object lying behind phenomena (phenomenalism). According to this doctrine, entities which are not accessible empirically, are merely mathematical tools that help scientists, and

no existence should be attributed to them. Similarly, one is not supposed to talk about what happens between observations.

• The value of scientific theories lies in their usefulness as tools of predicting phenomena and not their truthfulness (pragmatism). In fact , all scientific theories and laws are merely instruments for predicting phenomena, and not statements referring to a reality behind phenomena (instrumentalism).

The Influence of Empiricism on Scientists

As we saw, the empiricism of the seventeenth and eighteenth centuries developed into various schemes in the twentieth century, all of which had the following ideas in common:

• emphasis on the primacy of empirical data.
• emphasis on the clarity of concepts.
• rejection of metaphysics.

This kind of outlook largely affected the scientists of 1920s' and 1930s' to a large extent, and its ghost is still marching on in most of the circles.

Challenges to Empiricism

Now, it would be expedient to have a critical appraisal of empiricists' claims:

1- It is said that all our knowledge is based on sense-data, i.e., observation is the source of all knowledge. This assertion may be challenged on the following grounds:

• We never encounter nature with empty minds, and

therefore, there is no such thing as pure experimental data. Our interpretation of experimental data and even our view about the reliability of experimental data depends, to some extent, upon preconceptions and assumptions that are held by the scientist . The reason for this fact is that a theory can be considered to be a direct result of an experiment if we can show that there can be no alternative explanation for that experiment; but this we can never claim, and our past experiences have warned us against this type of mistake. The agreement between a theory and a set of experimental facts does not necessarily mean that it is a correct one, because, logically speaking, a conclusion can be drawn from different premises. Thus, we can never claim that a theory is a direct result of experimental data. The growth of science is, therefore, due to both experimental work and theoretical speculations.

• Many concepts are not derived from sense experience. For example, the concept of "causality" is not derived from sensory impressions. For instance, all that we receive through our senses is that ordinarily B comes after A. That there is a causal relation between A and B is a judgment of our intellect. Even in the physical sciences, many concepts are not direct byproducts of observations and have been introduced by scientists to explain experimental facts. For example, our information about distant regions of space and time is not direct.

• We often use fruitful concepts, like quarks, that do not seem to be directly observable. Strict empiricism forbids such concepts. But, this could block the advancement

of science. Had physicists followed Mach's negation of atoms, physics would have not had such impressive progress in the twentieth century.

In the history of physics, we have many cases in which an abstract mathematical concepts was introduced with no physical grounds for it, but subsequently turned out to be essential for the development of some physical theory. When Gauss and Riemann developed Riemannian geometry, there was no physical grounds for it. It was several decades later that Einstein made use of this geometry to develop his general theory of relativity. Similarly, when Hilbert developed his theory of Hilbert space, quantum theory had not been developed yet and the need for this concept had not been felt. It was von Neumann who subsequently made use of this concept in his formulation of quantum theory. It is due to the important role of theoretical concepts that **R. Carnap**, one of the leading logical positivists, admitted, in one of his later writings, that:

> *The prodigious growth of physics since the last century depended essentially upon the possibility of referring to unobservable entities like atoms and fields. (5)*

• The number of experiments that verify a universal law of nature is always limited. Thus in accepting a proposition as a general law one is exceeding experience.

On the other hand, no science can avoid introducing general laws , as the aim of science is the discovery of such laws. But logical positivists reject such laws on the

grounds of limited verification. Thus, strict following of positivistic trends reduces the whole physics to mere restricted prescriptions.

• A scientist's work is based, consciously or subconsciously, on some general principles. These so-called ´ guiding (or regulative) principles` are not deducible from particular experiments; rather, they are metaphysical assumptions which establish a framework for scientist's line of research. For **Heisenberg**, ´ mathematical simplicity` was a guiding principle:

> *Mathematical simplicity ranks as the highest heuristic principle in exploring the natural laws in any field opened up as a result of new experiments. (6)*

But the simplicity of nature is not a scientific fact on which all scientists agree, rather it is a metaphysical principle.

The conclusion we want to derive from the foregoing discussion is that experimentation alone, without theoretical reasoning, cannot give us significant information about nature. Thus, even though observation and experimentation are a must for having a thorough picture of the physical world, not all of our knowledge about nature is derived from sensory experiences.

Have Physicists succeeded in Dismissing Philosophy?

We saw that under the influence of positivist's anti metaphysical slogans physicists dismissed philosophy. Now, we claim that the lack of allegiance to the scientific-philosophic tradition has been only a pretension, and that

in practice physicists have always been under the influence of some metaphysical doctrines and their current attitude towards philosophy is rooted in their following certain philosophical schools. To support our claim, we make use of the following facts:

1. Many of the leading scientists of our time, including the founders of quantum theory, have admitted that some of their decisions had philosophical roots rather than dictated by the requirements of physics. Here we cite some examples:

• In his letter to Pauli on November 8, 1922, **Schrödinger** emphasized that their differences were philosophical and that his rejection of causality was a philosophical decision rather than being based on physics alone.

• In a paper, on the quantum mechanics of collisions, **Max Born** admitted in 1926 that his renunciation of determinism in the atomic world had been a philosophical decision:

> *I myself am inclined to give up determinism in the world of atoms, but that is a philosophical question for which physical arguments alone are not decisive. (7)*

2. Many of the contemporary physicists claim that they do not believe in any philosophical doctrine, and that they only follow the requirements of experiments. In practice, however, all physicists are under the spell of some supra-physical principles. In fact, no physicist encounters any observation without some philosophical view-points. Here, we mention some of the philosophical doctrines that prevail among contemporary physicists:

• Nothing is real until it becomes part of human experience.
• The task of physics is to describe and correlate phenomena, and there is nothing beyond phenomena.
• Theories are only instruments for the prediction of phenomena, and they do not refer to anything behind phenomena.
• Any concept derives its meaning from its operational definition. Thus, electric field is meaningful if we can specify a method for its measurement.
• Classical concepts are the only ones to be used. . Nature is comprehensible and can be described in mathematical terms.
• There is a superforce from which all fundamental forces of nature could be derived.
• The law of conservation of energy could be violated in times compatible with the indeterminacy relation.

3. Many of the problems discussed in physics circles are really philosophical in nature, for which physics alone can not provide a solution. Here we mention samples of such problems.

• Are space and time coordinates really equivalent?
• Does quantum mechanics describe an individual system or an ensemble of similarly prepared systems?
• Can every statistical theory be derived from an underlying deterministictheory?
• Can we formulate quantum mechanics without reference to any observer?
• Does quantum mechanics require a logic of its own?
• What is the ontological status of virtual particles of quantum field theory?

• Should one give priority to mathematical intuition or to physical intuition?

How Metaphysics Affects Science?

There are several ways in which philosophy can affect scientists.

1. A scientist's philosophical outlook characterizes his goal in his scientific research, and, therefore, his line of work. An empiricist is confined to gather experimental data and to give phenomenological models which could accommodate them. But a physicist with a wider philosophical outlook is not satisfied with a mere phenomenological description. He simply wants to understand nature. As **Heisenberg** puts it:

> *At this point you see the enormous importance of the philosophical background in research. It does not determine the answers when the questions are given, but it does influence the questions. The results of scientific work can be quite different if you either try to find out the plan according to which nature is constructed, or you just want to observe, to describe and to predict the phenomena. The final understanding can depend on this decision. (8)*

It is often due to philosophical considerations that a physicist accepts or rejects a new theory or establishes a specific line of research. Here we cite some recent precedents:
- Heisenberg's rejection of Bohm's hidden variable theory was based on aesthetic grounds rather than the requirements of physics.

- In his conversation with the editorial board of theoria, **Heisenberg** attributes different attitudes of his students with regard to quantum theory to their different philosophical background:

> *The Japanese or Chinese pupils I had sometimes found it easier to adapt their thinking to the methods of quantum theory than the Europeans, just because for the European the complete separation of the spiritual world and the material world – expressed, e.g. in the philosophy of Descartes – led to a basis of speaking in which he felt it difficult to get into quantum theory. (9)*

2. Philosophy provides a framework for science.

As **Schrödinger** points out:

> *Metaphysics does not form part of the house of knowledge but is the scaffolding without which further construction is impossible. (10)*

In fact, the work of any scientist, whether he knows it or not, is based on some general principles. In **Schrödinger's** words:

> *Science is not self-sufficient, it needs a fundamental axiom, a basic axiom coming from outside. (11)*

The metaphysical principles act as guiding principles for the scientist and have a fundamental role in his scientific research. Here we cite some examples:

• For Galileo the metaphysical doctrine that nature is describable by mathematics was a guiding principle.

• For Einstein and Dirac, mathematical beauty was a criterion for the acceptability of a theory.

• For Schrödinger the comprehensibility of the external processes in nature was an axiom.

• In our time, the unification of the fundamental forces of nature is a hot issue. From Einstein to **Witten** we see emphasis on this theme. In his 1989 lecture in Treiste, Witten asserted that the goal of physicist is to start with generally unifying ideas.

3-The negligence of ontological or logical considerations could lead scientists into serious mistakes. Can we conclude from the mathematical identity of two theories, their physical identity? One can not answer such questions on purely physical grounds. Very often physicists construct a theory on the basis of a general idea and then that theory is falsified by experiment. Then, they conclude that the general idea is refuted. Here, they forget the fact that the refutation of a special manifestation of a general idea does not exclude that idea. Science often raises some questions for which answers lie beyond its domain. Where do the laws of nature come from? Why are they comprehensible to us? Why is there a universe in which such laws apply and what is its purpose? The fact that the laws of nature are mathematical needs an explanation. It is true that mathematical theorems are logically true, but they, by themselves, have no empirical content. On the other hand, physical laws have empirical content. Thus, the question arises as to why mathematics, which is a product of human intellect, is so much suitable for the description of the physical world?

Some people have taken science to represent the whole truth about the world. This view, however, is taking for

granted that the reality to which science has access is the whole reality, and that there is no way other than science to reality. There is no justification for this assumption. One has to explain why science is reliable? Besides, Gödel's theorem indicates that to explain any axiomatic system, such as mathematics, one has to go beyond it. Thus, to explain science one has to appeal to meta-science (metaphysics).

The Revival of Philosophical Concern Among Scientists

As we mentioned , scientists dismissed philosophical speculations for several decades, and scientism acted like a new religion for the scientists, a trend that is still dominant among contemporary physicists.

In the last three decades, the tide has begun to turn in physics circles, and many physicists have started to question the sufficiency of the current theories and the positivist's doctrine of dismissing metaphysical speculations.

Today, there are many scientists who question the ability of science to answer the ultimate questions of human concern. Here we cite some evidences that confirm the revival of philosophical concern among physicists:

1. In recent years, there have been many conferences about the philosophical aspects of modern physics. For example, in the 25-years period between 1970-1994, more than 45 international conferences, on the foundations of quantum mechanics, were held in different parts of the world.

2. The number of scientific journals dealing with philosophical

aspects of physics has increased appreciably, and even some regular physics journals publish philosophically oriented articles.

3. In the last few decades, some physicists of high caliber, such as von Weizsaecker and H. Margenau paid attention to the philosophical aspects of physics and wrote extensively about them. Similarly, some philosophers, such as van Frassen, D. Albert and M. Redhead, have dealt with sophisticated problems of theoretical physics, and have contributed to its enrichment. Finally, we have scholars like A. Shimony and J. Cushing who have got Ph.D.s' in both physics and philosophy and teach in both disciplines.

Thus, it has become clear that the positivistic attitude of avoiding philosophical speculations is a futile one, that the anti-metaphysical current of the recent past was a transient affair, and that we can not dispense with metaphysics. As **Burt** puts it:

> *There is no escape from metaphysics ... the only way to avoid becoming a metaphysician is to say nothing. (12)*

In fact, every scientist's work is intricately interwoven with philosophical thinking, and his research would be fruitless without ontological outlook, though he might not be aware of it. The dismissal of metaphysics does not solve any problem. It merely replaces an explicit philosophy with and uncontrolled and naive philosophical outlook. In **Heisenberg's** words:

> *I believe that certain erroneous developments*

> *in particle theory – and I am afraid that such developments do exist – are caused by a misconception by some physicists that it is possible to avoid philosophical arguments altogether. Starting with poor philosophy, they pose the wrong questions. It is only a slight exaggeration to say that good physics has at times been spoiled by poor philosophy.(13)*

The important thing is to recognize the real status of metaphysics, and to note that science and metaphysics are complementary rather than contradictory. Thus, any apparent contradiction between them, would merely mean that one or both of them are wrong. The important thing is to avoid being caught by wrong metaphysics, and to note with physicist **John Ziman** that:

> *The divorce of science from philosophy impoverishes both disciplines. (14)*

II-The relevance of religion to science

Science is usually taken to be an objective, value-free enterprise. Thus, when the concept of 'religious science' is brought up, it is said that physics, chemistry, etc. are neutral toward any religion or ideology, and in fact science and religion are two independent human endeavors.

We believe that some interpretations of the concept of religious science are misguided and that this concept is badly interpreted. Our scientists or students of science are neglecting the fact that the selection between various theories depends to a large extent on the metaphysical presuppositions of scientists. In fact, as Einstein

emphasized, theories are not pure deductions from experiments. Scientists' metaphysical commitments have a large influence in the development as well as the interpretation of theories. If science was simply based on simple observations, then there would be no difference between Islamic or non-Islamic science. But, the generalizations from simple or limited experiments to general claims always take place within an explicit or implicit metaphysical framework. Consider, e, g. the science of cosmology. One of the difficulties of this science is that we are observing the universe from a specific corner and our knowledge about most of the celestial objects is indirect. Thus, we are forced to extend our local physics and in this extension we are using some assumptions which are not directly verifiable. For instance, we often make the following assumptions:

(i) Local physics is extendable to the whole universe.

(ii) Our location is not a privileged one (Cosmological Principle).

(iii) Our world is a four dimensional space-time continuum.

(iv) The red shift observed for the light reaching us from distant galaxies is due to the expansion of the universe.

Scientific theories are made under the influence of scientists' metaphysical outlook about the nature of physical reality, and this in turn has frequently been under the influence of philosophical or religious commitments. Recent studies have shown that religious ideas have been influential in the making, selection and evaluation of theories. It seems obvious that if one is not denying other

kinds of knowledge besides the scientific knowledge, then there will be room for the revealed knowledge and its effect on scientific knowledge.

Here we want to elaborate on the relevance of religion to science and in this direction we make two claims:

(i) Metaphysical presuppositions of science can often be rooted in religious world views.

(ii) Religious outlook is effective in the proper orientation of the applications of science.

The Root of Metaphysical Presuppositions of Science in Religion

Empirical science often starts with experiments and observations. But, in the selection of experiments and observations, the presuppositions of scientists are very important. For example, Heisenberg opposed the indefinite divisibility of atomic objects on philosophical grounds, and so he questioned the advisability of building more powerful atom smashers .. It is, however, in the interpretation and extrapolation of experimental results that the presuppositions of scientists are mostly effective. What an experimentalist does could be the same throughout the globe. Even the phenomenological description of phenomena could be the same. But in the making of universal theories, the philosophical presuppositions come into play and these could have religious origin. As **Mawdudi** put it:

> *In all sciences, there are two aspects. One aspect consists of realities of nature, i.e. facts. Another*

aspect is the human viewpoint which classifies these facts, moulds them into theories and formulates some concepts. These two aspects need to be distinguished. As far as the facts are concerned, they are universal; they are just facts. But, for instance, the Marxist mentality organizes these facts according to Marxist outlook. You hear such terms as Russian science or Communist philosophy. Communism has a particular view of universe and man; it has its own theory of history as well ...Thus, every child in the communist societies learns the science developed according to communist ideology. Similar is the case with Western scientists. They have their own peculiar concept of the universe, God and man ... From these examples, we can see that each ideology shapes knowledge and science according to its own point of view. Whenever Muslims learnt different branches of arts and science, they Islamized it in the sense that they contemplated them with Muslim Mind. (15)

Andre Linde, the celebrated Russian cosmologist, sums up the matter elegantly:

When scientists start their work, they are subconsciously influenced by their cultural traditions. (16)

For example, when we are dealing with the problem of the beginning of the universe and we want to select between the current theories, our previous mentalities are effective in our selection. A theist interprets the available

facts within one framework and an atheist sees it in another one. In other words, the worldview of a scientist gives him orientation in theorizing and in the selection of theories. Four examples can illustrate our point. **(1)** the unification of the fundamental forces of nature is one of the major occupations of the contemporary particle physicists. For the unification of the electromagnetic force and the weak nuclear force, three physicists received 1979's Nobel Prize in physics jointly (Salam, Weinberg and Glashow). But the motivation of the three was different in following this line of research. Salam believed that the unity of the forces of nature is an indication of the unity of the Ruler of nature, Glashow saw the significance of this effort in its practical utility, and Weinberg was attracted to this idea because of the simplification that it produces. **(2)** In recent decades, it has been noticed that the emergence of life in the universe depends upon a delicate balance of certain physical factors such as the strengths of the fundamental forces of nature. For example, had the strength of the gravitational force been slightly stronger than the present value, the expansion of the world would have been stopped and the contraction would have started. Then, there would have not been any opportunity for the formation of galaxies. On the other hand, had the strength of the gravitational force been slightly less than its present value, the world would have expanded too fast, and there would have not been any opportunity for the formation of stars. In either case, the conditions for the formation of carbon atoms, which are one of the material grounds

for the appearance of life, would have not be met. Thus, it seems that the laws of physics are in such a way that they make the development of life possible. This fine tuning of the fundamental constants and forces of nature is called **anthropic principle**.For this principle two main explanations are often given:

(i) There are infinitely many universes. Thus, there is no surprise that one of them has necessary conditions for the emergence of life.

(ii) We have only one universe, and this has had a designer at work.

Theist scientists have favored the second interpretation, whereas atheist scientists have supported the first one. For example, **Peter Atkins**, of Oxford University, supports the many - worlds interpretation:

> *It is possible that this is not only universe, it is possible that universes are falling into existence while we are speaking at the moment.... You can imagine a whole crowd of billions and billions of universes, and it just happens that one of those (many be more than one, but at least one of those) happened to tumble into existence with a particular mix of fundamental constants that allowed life to develop.(17)*

where as **Roger Trigg** , an eminent philosopher of the University of Warwick, supports the theistic interpretation of the anthropic principle:

> *I think that it [anthropic principle] does point to something, like an argument from design. It is a*

modern argument from design for the existence of God. Now, I know that it isn't a knock-down argument; other people may see it differently. Some people talk about an immense number of universes and it just happens that we're in the universe that produced us – we wouldn't be in one that hasn't produced us! But, I think if the answer to a question is an infinite number of universes, one's in great difficulties. I think it's much simpler to believe in God who created the one universe, rather than saying there are an enormous number and we just happen to be in the one that's come up in this way. (18)

Of course, the many - world hypothesis is itself non-verifiable, as **Jastrow** has put it elegantly:

Some scientists suggest, in an effort to avoid a theistic or teleological implication in their findings, that there must be an infinite number of universes, representing all possible combinations of basic forces and conditions, and that our universe is one of an infinitely small fraction, in this great plentitude of universes, in which life exists. Perhaps it is the only Universe within this infinite multitude in which life exists. But I find this to be a rather formal solution to the philosophical dilemma created for scientists by the anthropic principle – a typical theorist's solution. In any case, it is an unstable proposition, because all these other universes are forever beyond the range of our observations; they are outside the borders

> *of the visible universe, and can never be seen. What is forever unobservable and unverifiable, seems to me to be scientifically uninteresting. (19)*

Besides, even the existence of many worlds with different fundamental constants is compatible with theism: God could have created many independent worlds with different characteristics.

(3) Darwin's theory of evolution claimed that all living things have evolved by natural processes from preexisting forms. This process occurred through a mechanism called natural selection. The theory of evolution has been interpreted both theistically and atheistically. In the atheistic interpretation, natural selection alone is enough to cause the evolution of species. As **Richard Dawkins** put it (in a BBC2 program, Jan. 1987):

> *Evolution, the blind designer, using cumulative trial and error can search the vast space of possible structures ... blind chance on its own is no kind of watchmaker. But chance with natural selection, chance smeared out into innumerable tiny steps over eaons of time is powerful enough to manufacture miracles like dinosaurs and ourselves. (20)*

But, upon reflection, one sees that zoological data alone cannot negate God's role, because from simple experimental results one cannot deduce universal facts. In fact, the evolution could be interpreted theistically. As **Arthur Peacocke** put it:

> *I think the theory of evolution has articulated,*

> *unraveled and made clear to us how — to put it theologically — God has been creating life and different forms of life. The evolutionary process is one which enables new forms of life to come into existence. But it does not answer the question why should there be such a process at all. (21)*

In fact, the assumption of a mechanism for the evolution of species does not imply that there is no designer.

(4) One of the controversial problems of our age is the purposefulness of nature. Modern science has been dealing with the description of phenomena and has ignored teleological considerations in scientific research. The founders of modern science, who were devoted theists, did not deny the presence of telos to the universe, but they did not consider the job of science to deal with teleological considerations. With the development of science and the dominance of empiricism, teleology was considered as an avenue for theism. Therefore, atheists have been insisting on denying any kind of teleological considerations. In **Atkin's** words:

> *A gross contamination of the reductionist ethic is the concept of purpose. Science has no need of purpose. All events at the molecular level that lies beneath all our actions, activities, and reflections are purposeless, and are accounted for by the collapse of energy and matter into ever-increasing disorder. (22)*

R. Dawkins has the same idea:

> *Natural selection, the blind, unconscious,*

> *automatic process which Darwin discovered, and which we now know is the explanation for the existence and apparently purposeful form of all life, has no purpose in mind. It has no mind and no mind's eye. It does not plan for the future. It has no vision, no foresight, no sight at all. If it can be said to play the role of watchmaker in nature, it is the blind watchmaker. (23)*

Can one, on the basis of data obtained from chemistry or molecular biology at the level of molecules or atoms, claim that there is no telos to the nature? The answer is no, because this conclusion is not drawn directly from science, rather it is rooted in the metaphysical prejudices of the scientist. It is in fact, a jump from an epistemological statement to an ontological one, and is a direct result of restricting the whole existence to the material world and the sources of our knowledge to sense impressions.

The conclusion we want to draw from these examples is that when we are dealing with fundamental problems in science, decision making is difficult within the science itself. It is here that scientists use their metaphysical commitments. In fact, no knowledge is free from these kind of presuppositions, because in the interpretation of scientific data, scientists always make use of various assumptions and these are full of value judgments and non-scientific considerations. These metaphysical assumptions could be taken from the sphere of religion. For example, **Einstein** considered the idea of the comprehensibility of nature to have been taken from the sphere of religion:

> *To this [sphere of religion] there also belongs the faith in the possibility that the regulations valid for the world of existence are rational, that is comprehensible to reason. I cannot conceive of a genuine scientist without that profound faith. The situation may be expressed by an image: science without religion is lame, religion without science is blind. (24)*

Andre Linde, an eminent contemporary Russian cosmologist, who is not a theist, believes that the idea of searching for a theory of everything is rooted in the monotheistic religions:

> *The whole of modern cosmology has been deeply influenced by the Western tradition of monotheism ... the idea that it is possible to understand the universe through one ultimate "Theory of Everything" is an outgrowth of belief in one God. (25)*

III-The Role of Religion in Guiding the Applications of Science

As we mentioned, scientific activity could be pursued within different metaphysical frameworks. Both a theist and an atheist can do successful scientific work. The difference appears in the goals and results. If scientific work is done within a theistic framework, its practical results is expected to secure human felicity and welfare. But, if it is pursued within a secular matrix, there is no guarantee for its being immune from destructive results. The last century witnessed many of the destructive results of science. **Dr. Richard Thompson**, of La Jolla Research

Institute in California, has elaborated on this subject:

> *The understanding of nature as a machine has resulted in much technological progress, but now we find people throughout the world abandoning supremacy — a struggle that culminates in the construction of more and more deadly machines of mass destruction. It can be argued that this trend of modern civilization has been strongly encouraged by scientific theories that appear to contradict any philosophy of life other than materialism. It may be very difficult to change this dangerous trend. But an essential ingredient for such a change could be the wide dissemination of a valid approach to scientific knowledge that allows for tangible spiritual dimension to human life and is compatible with the ancient understanding that mankind is dependent on a transcendental supreme Being. Such an approach opens up the possibility of directly human energy towards higher spiritual goals and of providing a solid ethical basis for the conduct of our material affair.(26)*

The history of science has shown that value systems affect the orientation of science, and this can be more effective through religion In the words of **John Brooke**, the British Historian of science:

> *The direction and application of scientific research clearly can be different under different value systems. And since human values are often organically linked with religious beliefs, the latter can still be presented as relevant to the orientation of science and technology.(27)*

Conclusion

We pointed out that scientific work can be done in a religious (theistic) context or in a non-religious context. These two have many common elements (e.g. in experimentation or theoretical work), but in the long rum they are bound to lead to different results both at the practical level and at the theoretical level (e.g. in the construction of universal theories).

Now we want to go one step further and in the company of **Roger Trigg** argue that science can gain proper legitimation only in a theistic context. Our argument goes as follows: (28)

(i) For doing scientific work, we must accept that the world with which science deals is orderly and lawful. This cannot be deduced from science itself. Rather, we need the philosophical assumption that the unknown is similar to the known and that the data of science are applicable for all times and places with confidence. Without these assumptions we cannot generalize our scientific findings;

(ii) The applicability mathematics to the physical world seems miraculous. Why should the symbols created by human mind be suitable for unraveling the mysteries of the universe and for giving us control over the physical world . It seems that there is an underlying rational built into the fabric of the universe and that there is a tuning between human mind and the rest of the cosmos which makes the universe understandable to human beings. Without the existence of these two factors there would be no science.

(iii) Now, the question arises as to why the reality has

this built in order and why human mind can comprehend it?. One answer would be that this is just the way things are. But, this is not the kind of answer that can give us confidence about the universality of science. A more substantial response is that this is the state of affairs because God made it that way. This is moving on from a metaphysical realism to theism.

(iv) In view of the foregoing considerations, it seems reasonable to claim that science can get its legitimacy in no other context than a theistic one. This is because science requires presuppositions that are only deducible from theism. The history of the development of modern science is a good witness to this fact.

(v) Now , from the following facts:

- Science is based on some metaphysical principles
- These principles are usually taken from a philosophical school or a religion
- Monotheistic religions provide the metaphysical principles needed for scientific activities

we deduce that metaphysics works as a bridge between science and religion.

Resources

(1) Brody,T. , The Philosophy Behind Physics. (Berlin: Springer-Verlag , 1994),p. 313.

(2)Weyl,Hermann,Space,Time,Matter(DoverPublications,Inc,,1921),p.10

(3) Heisenberg, W., Werner Heisenberg Collected Works , Series C, Part III(Berlin: Springer-Verlag , 1985) ,p.338.

(4) The Collected Papers of Bertrand Russell ,Vol. II, ed. by. J. G. Slater (London: Routledge, 1997) , p. 594.

(5) The Philosophy of Rudolf Carnap , ed. B y P.A. Schilpp (La Sall,Ilinoise: Open Court, 1963), p. 79

(6) Heisenberg, W., Philosophical Problems of Quantum Physics (Woodbridge, Conn. : Ox Bow Press. 1979), pp. 58-59.

(7) Born, M. ,1926, " On the Quantum mechanics of Collisions" , English translation in Quantum Theory and Measurement, ed. By J.A. Wheeler and W. H. Zurek (Princeton Princeton University Press, 1983) p. 54.

(8) Heisenberg, W. , Werner Heisenberg Collected Works (Berlin : Springer-Verlag, 1985) , p. 499.

(9) Ibid. P. 477.

(10) Schrodinger, E. , My View of the World. (Cambridge: Cambridge University Press, 1964),pp. 4-5

(11) Schrodinger, E. , Scientia , 57,1935,p.181

(12) Burtt ,E .A. , The Metaphysical Foundations of Modern Science (New York: Dover Publications, Inc. , 2003) , P. 227.

(13) Capri, A.Z., From Quanta to Quarks (New York: World Scientific Publishing, 2007) , p. 45.

(14) Maxwell, N., From Knowledge to Wisdom (Oxford: Blackwell, 1984), p.27.

(15) Mawdudi, A., " Moudoodi on Science", trans. By Rafat, Journal of Islamic Science, Vol. 10 , No. 2, 1994, pp. 113-114.

(16) Wertheim, M. , "God is also a Cosmologist", The New York Times , June 8 , 1997.

(17) Stannard , R., Science and Wonder (London: Faber and Faber. 1996), pp. 24-25.

(18)Ibid. , p. 30

(19) Jastrow, R. , in The Intellectuals Speak out About God, Varghese, A., ed. (Chicago: Regenery Gateway, Inc. , 1984), p. 22.

(20) Poole, " God and Richard Dawkins", Science and Cristian Belief, Vol. 7, No. 1, April 1995, pp. 51-58.

(21) Stannard, R. , op. cit. , p. 54.

(22) Cornwell, J. , ed. , Nature's Imagination (Oxford : Oxford University Press, 1995) p. 127.

(23) Dawkins, R. , The Blind Watchmaker (New York: W. W. Norton, 1987) , p.5.

(24) Einstein ,A. , et al. , Ideas and Opinions (New York: Crown Publishers, 1954) p. 66.

(25) Linde A. , The Christian Science Monitor, July 9 , 1998, p. B4..

(26) Singh, T. D. and Gomatam, Ravi, eds. , Synthesis of Science and Religion (Bombay: The Bahtktivedanta Institute, 1987), p. 235

(27) Brook, John H. , Science and Religion :Some Historical Perspective (Cambridge: Cambridge University Press, 1991) , p.336.

(28) Trigg, R., Rationality and Religion: Does Faith need Religion? (Oxford: Blackwell Publishers, 1998) , pp. 80-83.

| CHAPTER FIFTEEN |

The Role of Religion in Science

Introduction

In this chapter we use science in a general sense which includes both natural and human sciences.Thus, it is necessary to begin with the views about this relation . In the Islamic world and the Western World, there are the following views:

(1) Some scholars consider science and religion to be different in subject ,method, aim, and language.Religion deals with God and science deals with the natural world. Science is based on experimental works and religion is basd on revelation.The aim of religion is to make one closer to God and the aim of science is to get knowledge about the natural world.The language of religion is God's worship and the language of science is prediction and control.

Among the believers in the independence of science and religion there are some people who believe in God, but consider these two domains to be independent.

(2) Some scholars consider science and religion to be in conflict.This includes some prejudiced religious people that only believe in religious texts and some materialists who believe only in material objects and don't believe in

God.In the words of **Jacques Monod**:

> *"Anything can be reduced to simple, obvious mechanical interactions. The cell is a machine. The animal is a machine. Man is a machine." (1)*

(3) Thare are some scolars who speak of dialogue between science and religion , because they belive that there are some common grouds between the two.For example, there are some problems that scientists are concerned with but science cannot answer,like the place of human beings in the world or the purpose of creation.Science per se deals only with the description of phenomena and the relation between them, but it cannot say anything about the nature of knowlde or the aim of human life. In the words of **P. Kush**(a Nobel Laureate in physics):

> *" Science cannot do a very large number of things and to assume that science may find a technical solution to all problems is the road to disaster." (2)*

Furthermore, faith is not only relevant to religion but it also plays an important role in science.For example , faith in the existence of an external world or its orderliness or its understandability is assumed in science, but it cannot be inferred from science itself.In the words of **Max Planck**:

> *"Anybody who has been seriously engaged in scientific work of any kind realizes that over the entrance to the gates of the temple of science are written the words: Ye must have faith. It is a quality which the scientists cannot dispense with." (3)*

(4) Some Scholars speak of the integration of science and religion ,because both of them deal with the same

world. Thus, they should have a consistent view about it ,i.e. they need a unifying worldview.But, as we shall see, religion provides a comprehensive metaphysical ground for science and justifies scientific activity
In the words of **Henry Margenau**:

> *"Science needs religion in order to account for its origin and its successes." (4)*

Furthermore, relihious worldview answers questions about creation and resurrection and about morality ,etc. that science cannot answer. As **Charles Townes** (a Nobel laureate in physics) put it:

> *" In my view, the question of origin seems always left unanawered if we explore from a scientific view alone. Thus , I believe there is a need for some religious or metaphysical explanation if we are to have one." (5)*

In my view, science is not parallel to religion , but is along religion .As some eminent scientists during the Islamic civilization era mentioned, scientific work involves experimental and theoretical work as well as benefitting from intuition and religious revelation.This view was shared by eminent sciemtists like Newton
and Leibnits in the beginning of modern science and is shared by some eminent contempory scirntists. As **Charles Townes** put it:

> *"I do not myself separate science and religion, but regard our exploration of the universe as part of my religious experience." (6)*

In fact , the main motif for Muslim scientists' study of nature was to find out about God's creation and to see the wisdom behind it. In his book "The Social Structure of Islam", Levy points out that the motivation of those Muslims that did research in science, was to see the glory of God's handiwork in the wonders of creation.(7)

The Role of Religion in Science

As we said, science is along religion., i.e. it offers some routes and objectives for science.These include:

- It provides metaphysical presuppositions for science ;
- It suggests the cannals of getting knowledge ;
- It answers questions that science cannot answer;
- It prevents the misuse of science; and
- It justifies moral values.

1. The role of metaphysical principles in science

In our view of science . Islamic worldview provideds a basis for all scivities of a person, including his scientific efforts. To clarify this matter ,we note that although empirical sciences start with obsevations and experiments , but, in the choice of observations and experiments the presuppostions of the experimenter are effective , and in generalizations and the choice between experiments and theories the presuppositions of the scientist are effective. This is specilally important when we are dealing with fundamental theories. Futhermore ,some time several theories explain the present data and these data cannot make a choice between them. Here the priorities of the

scientist make a choice between them.For example , in the atomic domain we have presently two quantum theories: The standard quantum mechanics (which denies causality in the atomoc domain) and the Bohmian quantum theory (which assumes causality), and the choice between them is on the basis of physicists' clear or hidden philodophical inclinations In cosmology too the theistic or atheistic inclinations of cosmologists are effective in their choice of theories.For example ,Fred Hoyle ,who was an eminent atheist cosmologist, chose that answer of Einstein's equations in general relativity that considered no begining of time for our univers, in order to avoid the assumption of a Creator for its origin.

In recent decades, one of the hot problems in cosmology is the assumption of many universes.Because , our recent knowledge indictes that our universe is finely tunned for the presence of life.. In order to avoide the assumption of a fine tunning by Gode, some cosmologists have appealed to the assumption of the existence of many universes which are not observable .But, both explanations involve metaphysical assumptions. As **Paul Davies** put it:

> *"Not everybody is happy with the many-universes theory. To postulate an infinity of unseen and unseeable universes just to explain the one we do see seems like a case of excess baggage carried to the extreme. It is simpler to postulate one unseen God. This is the conclusion also reached by Swinburne... Scientifically the many-universes theory is unsatisfactory because it could never be falsified: what discoveries would lead a*

many-worlder to hang her/his mind? What can you say to convince somebody who denies the existence of these other worlds." (8)

Another problem is the purposefulness of the our world. Some scientists consider no purpose for the world. As **Weinberg** put it:

"The present universe had evolved from an unspeakably unfamiliar early condition, and faces a future extinction of endless cold or intolerable heat. The more the universe seems comprehensible, the more it also seems pointless." (9)

And in **Richard Dawkin's** words:

"The universe we observe has precisely the properties we should expect if there is, at bottom, no design, no purpose, no evil and no good, nothing but blind, pitiless indifference." (10)

But, some physicists argue that our world is purposeful. As **Paul Davies** put it:

" If physics is the product of design, the universe must have a purpose, and the evidence of modem physics suggests strongly to me that the purpose includes us." (11)

Davies also believes that by denying the purposefulness of the universe one destroys the rational basis of science:

"If [the universe] isn't about anything, there would be no good reason to embark on the scientific quest in the first place, because we would have no rational basis for believing that we could thereby uncover additional coherent

and meaningful facts about the world. So, we might justifiably invert Weinberg's dictum and say that the more the universe seems pointless, the more it also seems incomprehensible." (12)

Furthermore ,the denial of the purposefulness of the universe is a philosophical decision, because not finding something does no imply its nonexistence.

Another important point is that all scientists use some guiding principles in their scientific work.For Heisenberg the simplicity and for Dirac the beauty of theories was an important factor in their choice of theories.In recent years the unifying of the fundamental forces of nature has been an objective for some eminent physicists, and it is interesting that even some secular scientists see the root of this search in religion. For example , **Andrei Linde** (an eminent Russian cosmologist) sees the root of this in monotheistic religions:

"The whole of modern cosmology has been deeply influenced by the Western tradition of monotheism ... the idea that it is possible to understand the universe through one ultimate 'Theory of Everything' is an outgrowth of belief in one God."(13)

2. Ways of understanding nature

In the contemporary science ,which is still governed by positivism, only empirical data and theoretical work on them is valid. But, since the monotheistic worldview does not confine the universe to matter, it has a more comprehensive look at the universe.

The Holy Qir'an emphasizes both the importance of our

senses in our cognition :

" Allah has brought you forth from the bellies of your mothers while you did not know anything.,and He made for you hearing,eyesight, and hearts so that you may give thanks. " 16/70)

And the significane of intellectual work on them:)

> *"Have they not travelled over the land so that they may have hearts by which they may apply reason... "(22/46)*

But, while the Holy Qir'an mentions intuition and prophetic revelation as ways of getting knowledge about our universe, many scientists do not believe in revelation, though some of them consider an important role for intuition (which is knowing something without needing to think about it or using reason to discover it).In the words of **Charles Townes**:

> *"Most of the important scientific discoveries come about very differently and are much more closely akin to revelation. The term itself is generally not used for scientific discovery, since we are in the habit of reserving revelation for the religious realm. In scientific circles one speaks of intuition, accidental disco-very, or says simply that 'he had a wonderful idea'." (14)*

3. Answering questons that science cannot answer

In the positivistic outlook ,science can answer all questions of humanity. But in the second half of the twentieth century some eminent scientists mentioned that science per se cannot answer humanity's ultimate questions-questions

like ' what are we doing here?', ' where are the laws of ature coming from?', and ' why we can understand the laws of nature?'.In the words of **Peter Medawar** (a Nobel Laureate in Medicine):

> *"That there is a limit upon science is made very clear by the existence of questions that science cannot answer and that no conceivable advance of science could empower it to answer. These are questions that children ask- the "ultimate questions" of Karl Popper. I have in mind such questions as:*
>
> *How did everything begin?"*
>
> *What are we all here for?*
>
> *What is the point of living? " (15).*

But some eminent scientists have mentioned that responses to these questions comes only from religion.In the words of **Alan Sandage** (an eminent contemporary cosmologist):

> *"It was my science that drove me to the conclusion that the world is much more complicated than can be explained by science... It is only through the supernatural that I can understand the mystery of existence." (16)*

Furthermore ,some scientists have explicitly mentioned that the respose to these questions can only come from religion.In the words of **Freeman Dyson** (an eminent contemporary physicst):

> *"The greatest unsolved mysteries are the mysteries*

of our existence as conscious beings in a small corner of a vast universe. Why are we here? Does the universe have a purpose? Whence comes our knowledge of good and evil? These mysteries and a hundred others like them, are beyond the reach of science. They lie on the other side of the border, within the jurisdiction of religion. " (17)

Neville Mott (a Nobel Laureate in Physics) has the same view about human consousness:

"I believe, too, that neither physical science nor psychology can ever 'explain' human consciousness... To me, then, human consciousness lies outside science, and it is here that I seekthe relationship between God and man." (18)

Science cannot also provide a basis for moral values although they enter into some scientific decisions.Thus, although **Popper** said that moral values are not deducible from science, he believed that they enter into the scientific activity:

"The fact that science cannot make any pronouncement about ethical principles has been misinterpreted as indicating that there are no such principles, while in fact the search for truth presupposes ethics." (19)

Now,since empirical knowledge cannot count for all aspects of himan life, some scieists have suggested that we have to appeal to other sources of human knowledge. In the words of **Bernard d'Espagnat**(an eminent French physicist-philosopher):

"It now seems plausible that approaches other than science (I mentioned music, painting and poetry) should also, concurrently with science, be capturing some undefinable something of the structure of independent reality." (20)

4. The role of religion in the applications of science

According to the Holy Qur;an ,God chose humans as his viceroy on the earth:

" When your Lord said to the angels,'Indded I am going to set a viceroy on the earth."(1/30)

And that God provided the necessities for human beings:

" Certainly We have established you 0n the earth and made in it means of livelihood for you." (7/ 10)

But God has assigned some personal and social responsibilities for human beings:

"By your Lord, we will question them all concerning what they used to do." (15/92-93)

And :

" And do not cause corruption on the earth after its restoration." (7 / 56)

And:

" They have faith in Allah and the Last Day , and bid what is right and forbid what is wrong, and are activein good deeds. They are among the righteous."(2/114)

All scientific work is done under a worldview ,and this could be secular or religious.If it takes place under

a monotheistic worldview,its result should be in the direction of human welfare. But if it is done under a secular worldview, there is no guarantee that it would not be unharmful to humanity.In fact,after a secular worldview became dominant over science and scientists sought the solution of all human problems from the prevalent science, the destructive effects of science became evident. So,after the end of the first world war, **Berrand Russell** warned about the dangers that human civilization is going to be confronted with . (21)

After the end of the second world war,a large number of scientists warned about the misuse of science against humanity and the environment and the spending of much money for military purposes.They also complained about the silence of the scientific societies in facing this dangerous cituation.**Nicholas Maxwell**(an eminent philosopher of science) has explained the matter beautifully:

> *"Much scientific and technological research is devoted to the interests of wealthy countries and not to the interests of the thousands of millions who live in abject poverty. Medical research is devoted primarily to the diseases of the wealthy, not the poor. And there is the scandal of military research. In the UK, 30% of the budget for research and development is spent on the military. In the USA it is 50%. In our world, fraught with gross inequalities, injustices, conflict and war; one may well wonder whether this expenditure is in the best interests of humanity. Striking, too, is the*

general silence about the matter; the failure of the scientific community to speak up about it." (22)

It is interesting that some Western scholars admit that the misuse of science is due to the worldview governing over science.Thus, this worldview has to improve in order for science and technology to be used for the benefit of mankind.So, some scholars that are against the use of metaphysical presupposition in theoretical science have approved the use of religion in the applications of science.For example , **Micheal Stenmark** (a Swedish philosopher) who disagreed with me on the ruling of religious worldview in theoretical science ,recommends its usage in the applications of science.He recommends that the training of scientists have to be accompanied by moral training and this can be best done in a religious context.(23)

In my view , if modern science had restriced itself to empirical data it could not have achieved the present progress and would have had only some tables of data. Much progress of science is due to generalizations to the areas that we don't have access to them, and this involves the use of some metaphysical presuppositions which are sometimes theistic or atheistic.For example ,one theory says the universe is purposeful and the other denies the purposefulness of the universe .One can choose one of them or just be an agnostic , in whice case there is no progress in science.We have many cases like this and we mentioned some of them earlier.

In short, in science we have to choose between theories

that explain available data, and these are sometimes theistic or atheistic.

Misunderstandings about Religious Science

While the Holy Qur'an and Islamic traditions have invited people to study Allah's glory in the creation and have given clear ontological and epistemological instructions , both during the old times and our time many scholars have considered the Qur'an to be an encyclopedia of our knowledge about our universe, and some scholars have tried to show the miraculous status of the Holy Qur'an in indicating the findings of modern science.But this is wrong for the following reasons:

1. science is in progress and we have many uknowns about universe. At the moment we know less than ten percent of the matter of the universe. So, it is not right to reconcile the findings of our incomplete knowledge of the universe with Holy Qur'an.

2. The Qur'an frequently invites us to study nature by using our senses and intellectual work:

> *"Say :Travel over the earth and then observe how He has originated the creation." (29/20)*

And:

> *" Do they not observe the camel [to see] how he has been created?and the sky,how it has been raised?and the mountains, how have they been set? and the earth,how it has been surfaced?"(88/17-20)*

In fact, the Qur'an asks us to explore nature ourselves in order to feel the glory of the creation. This is the understang

that eminent Muslim scholars of the Islamic civilization era and notable scientists of the modern science had , and some great scientists of our time have .

3. If the Qur'an was describing details of the creation, then we would not be invited to use our senses and intellect for the the discovery of nature and our intellect would not have the significance that the Qur'an attributes to it.

Conclusion

We saw that the present science is based on a restricted worldview in which :

- The universe contains only matter.
- There is no reference frame for moral values.
- Science cannot answer human beings' ultimate questions and some basic questions raised in science.
- Scientists use some presuppositions for which there is no base in science.
- Science is misused for humanity and our environmemt.

Thus,we need a more comprehensive worldview which does not restrict the world only to matter,can account for moral values,gives answers to our ultimate as well as supra-scientific questions, provides the necessary metaphysical principles for choosing between theories ,and guides us in the applications of science .A monotheistic religious worldview can take care of af all of these matters, and a science based on such a worldview dan be called a religious science.This is the worldview that was prevalent among Muslim scientists during the Islamic civilization era and among the founders of modern science ,and has

some proponents amog the eminent contemporary siensts and philosophers of the West and the Islamic countries

References

(1) Barbour,Ian, Religion and Science (San Francisco : Harper, 1997), p.80

(2) . Jaki, Stanley ,The Relevance of Physics (Edinburg : Scottish Academic Press, 1992), p.500

(3) Planck,Max, Where Is Science Going, trans. By J. Murphy (New York: Norton, 1932), p. 214

(4) Margeneau , H. & Roy A. Varghese, Roy A. , Cosmos, Bios, Theos (La Salle, Illinois : Open Court, 1992), p. 62.

(5) Ibid. ,p. 123.

(6) Singh,T. D. & Gomatam,R., eds. , Synthesis of Science and Religion (Bombay : The Bhaktivedanta Institute, 1987), p. 141

(7) Levy,R. , The Social Structure of Islam(Cambridge : Cambridge University Press, 1967) , P. 460.

(8) Davies, Paul , The Mind of God(New York: Touchstone, 1993), p. 220.

(9) Weinberg ,S., The First Three Minutes:A Modern View of the Origin of the Universe (New York :Basic Books,1993), p .154.

(10) Dawkins, Richard, River Out of Eden: A Darwinian View of Life (New York: Basic Books, 1995), p. 133.

(11) Davies, P. Superforce: The Search for a Grand Unified Theory of Nature (New York: Simon &Schuster, 1984), p.243.

(12) Davies, Paul, The Goldilocks Enigma: Why Is the Universe Just Right for Life? (Great Britain: The Penguin Press, 2006), p.16.25.

(13) The Christian Science Monitor, July 9, 1998, p. B4

(14) Townes, . Charles H.. "The convergence of science and religion", in Zygon, 1, no. 3, (1966), p. 307.

(15) Medawar, Peter, The Limits of Science (Oxford : Oxford University Press, 1984), p. 66.

(16) Sandage , Alan, Newsweek, 20 July 1998, pp. 47-52.

(17) Dyson, F. , "New mysteries : the price and promise of human progress" , Science and Spirit, July / August 2000 , Vol. 11, No. 3.

(18) Mott, Neville, Can Scientists Believe ? (London: James & James ,Science Publishers Ltd.,1991), pp. 8 -14.

(19) Popper, K. " Natural selection and the emergence of mind ", Dialectica,

32 , 1978 , pp. 339-355.
(20) d`Espagnat ,B., " Veiled reality " in Symposium on the Foundations of Modern Physics , ed. by P. Lahti and P. Mittelstaedt(Singapore : World Scientific , 1987), p. 160.
(21) Russell, B., ICARUS or the Future of Science (London: Kegan Paul,Tubner Co. Ltd. , 1924),pp.62-63.
(22) Maxwell, N. , «Do we need a scientific revolution?», Journal of Biological Physics and Chemistry 8 (2008) ,pp. 95-105
(23) Stenmark, M. , How to Relate Science and Religion (Cambridge, UK: W. B. Edermans Pub., 2004), pp. 228-229.

| CHAPTER SIXTEEN |

FUTURE SCIENCE NEEDS A MORE COMPREHENSIVE FRAMEWORK

Introduction

The world in which we live today is very different from the medieval times and the difference can be attributed to science and its technological offspring. The advances made during the last two hundred years in the physical and biological sciences, have expanded our understanding of the world in an unprecedented manner. Similarly, the advances in the practical applications of science has given us an enormous control over the forces of nature and human minds. But the developments brought about by science and technology has been both beneficial and detrimental to mankind. For example, scientific and technological knowledge has increased physical comforts, life expectancy and the standards of living beyond any expectation of our ancestors. On the other hand, science and technology have been used for the destruction of our fellow human beings and the pollution of our environment, and a large number of scientists have been working in military research establishments producing means of mass destruction, and unfortunately the scientific community has played a passive role in this regard. Freeman Dyson, an eminent physicist of our time,

has put the matter elegantly:

> *«The failure of science to produce benefits for the poor in recent decades is due to two factors working combination: the pure scientists have become detached from the mundane needs of humanity, and the applied scientists have become more attached to immediate profitability." (1)*

The rapid progress of science during the nineteenth century, led to the expectation that science alone can handle all problems of human concern. Thus, in the early decades of the twentieth century many scholars and politicians prophesized that science would solve all problems of humankind and would promote human happiness. **Jawaharlal Nehru**, the first prime minister of independent India, echoes the view of these people:

> *«It is science alone that can solve the problems of hunger and poverty, of insanitation and illiteracy, of superstition and deadening custom and tradition, of vast resources running to waste, of a rich country inhabited by starving people.... Who indeed could afford to ignore science today? At every turn we seek its aid.... The future belongs to science and to those who make friends with science." (2)*

But as early as 1924, Bertrand **Russell** expressed skepticism about science being a total blessing for mankind:

> *"Mr. Haldane›s* **Daedalus** *has set forth an attractive picture of the future as it may become through the use of scientific discoveries to promote*

human happiness. Much as I should like to agree with his forecast, a long experience of statesmen and government has made me somewhat skeptical. I am compelled to fear that science will be used to promote the power of dominant groups, rather than to make men happy." (3)

In **Russell's** view, the bad effects of science are rooted in the fact that science by itself cannot control human passions:

"Science has not given men more self-control, more kindliness, or more power of discounting their passions in deciding upon a course of action. It has given communities more power to indulge their collective passions, but, by making society more organic, it has diminished the part played by private passions. Men›s collective passions are mainly evil; far the strongest of them are hatred and rivalry directed towards other groups. Therefore, at present all that gives men power to indulge their collective passions is bad. That is why science threatens to cause the destruction of our civilization." (4)

Now, science can affect human life at two different levels:

1) At the practical level, it can solve human problems both at the individual and the societal levels.

2) At the theoretical level, it can enrich man's imaginative conception of the world.

During the middle ages and in the early days of modern science, the pursuit of science was for the sake of contemplating God's handiwork, rather than securing

material benefits for humankind. **Heisenberg** expresses Kepler's view of science eloquently:

> *"For Kepler, science is not at all a means of producing material benefits for man, or of making possible a technology for better living in our imperfect world, and opening up the paths of progress. Quite the contrary – science is a means of elevating the mind, a way of finding peace of solace in the contemplation of the eternal perfection of the creation." (5)*

At the practical level too, those scientists were conscious of the consequences of their Work.

(I). Why Has Contemporary Science Failed Its Promise?

In my humble view, all of the unpleasant consequences of current science are rooted in the dominance of a worldview among contemporary scientists that has the following characteristics: rejects any knowledge which is not rooted in sense data; neglects ethical issues in the scientific enterprise; controls and manipulates nature and human societies; neglects a holistic view of reality; and ignores humanity's ultimate concerns. Here we illuminate these points briefly.

(i) Restriction to the sensible realm

Modern science confines itself to the material real, and confers reality only to those things that can be rooted in sense data. Empirical verification is the court of ultimate

appeal. In the words of **Bertrand Russell**:

> *"Whatever knowledge is attainable, must be attained by scientific methods; and what science cannot discover, mankind cannot know." (6)*

Therefore, spiritual realities are considered either as unreal or reducible to physics. This has led to the negligence of God and the spiritual dimension of humankind and the separate development of science and culture.

All this is contrary to the Qura'nic outlook according to which our knowledge about the world is not restricted to the sense data, and there are many realities in the world to which we do not have any access:

(سبحان الذي خلق الازواج كلّها ممّا تنبت الارض و من انفسهم و ممّا لا يعلمون» (يس/36«

> *"Glory be to Him Who created pairs of things, of what the earth grows, of their own kind and of what they do not know. "(36: 36)*

With the tools of modern science, we can investigate physical phenomena, but we cannot comprehend universe›s underlying unity. The embedding of science within a more comprehensive framework, adds wisdom to science and leads to seeing the unity behind the diversity.

(ii)Value-neutrality of Science

It is commonly held in the scientific circles that science and ethics are two independent spheres of human concern. Thus, 'normative statements' cannot be derived from 'factual statements'. This had led to the idea of value-neutrality of science which has been very effective in marginalizing ethical considerations and has led to the

spread of moral relativism in modern societies and has weakened the ethical concerns in the scientific enterprise. But scientific work is not done in a human vacuum. Values outside science creep into the scientific practice at the human level. In fact, all scientific works involve some value judgments and these could be effective in the choice of theories or in the applications of science. As **Popper** put it:

> *"The fact that science cannot make any pronouncement about ethical principles has been misinterpreted as indicating that there are no such principles, while in fact the search for truth presupposes ethics." (7)*

There are other reasons for the marginalization of moral values in the scientific enterprise. For example, some of the current theories of science, such as Darwin's theory of evolution, have undermined the belief in an objective moral order. In fact, they credit moral values with only a utilitarian role. As **V. E. Frankl** elegantly put it:

> *"Values and meanings are nothing but defense mechanisms and reaction formations." (8)*

Excessive specialization, too, has isolated science from other areas of human concern. As **Toulmin** put it:

> *"It was the development of specialization and professionalization that was responsible for excluding ethical issues from the foundations of science." (9)*

We believe that science and ethics merge at the metaphysical level. Thus, a theistic metaphysics, like the

Islamic worldview, integrates science with ethics. This leads to accountability and responsibility of the scientist at all stages of his/her life.

In the Qura'nic outlook, one should combine the acquisition of knowledge with the acquisition of moral values:

«هو الذي بعث في الاميين رسولاً منهم يتلوا عليهم آياته و يزكيهم و يعلّمهم الكتاب و الحكمة و ان كانوا من قبل لفي ضلال مبين» (الجمعه/2)

> *"He is the One Who dispatched a messenger from the unlettered among themselves, to recite His verses to them and to purify them and teach them the Book and wisdom, even though previously they were in obvious error."* (62: 2)

(iii) Acquisition of power

Whereas the old science was looking for reading the book of nature as the God's handiwork, the dominant tendency in modern era has been to advance knowledge for the enhancement of the political and economic power and to look upon nature as a commodity to be exploited. **Schumacher** has put the matter elegantly:

> *"The old science – 'Wisdom', or 'science for understanding'– was primarily directed 'towards the sovereign good', i.e. the True, the Good and the Beautiful, the knowledge of which would bring both happiness and salvation. The new science was directed mainly towards material power, a tendency that has meanwhile developed to such lengths that the enhancement of political and economic power is now generally taken as the first purpose of, and main justification for, expenditure*

on scientific work. The old science looked upon nature as God's handiwork and man's mother; the new science tends to look upon it as an adversary to be conquered or a quarry to be exploited. The greatest and most influential difference, however, relates to the attitude of science to man. The 'science for understanding' saw man as made in the image of God, the crowning glory of creation, and hence 'in charge' of the world, because noblesse oblige. The 'science for manipulation', inevitably, sees man as nothing but an accidental product of evolution, a higher animal, a social animal, and an object for study by the same methods by which other phenomena of this world were to be studied – 'objectively'". (10)

The misuse of science and its technological offspring during the last century brought many curses for humanity and damaged the environment. This created serious discontent among some of the noted scientists of our era. In his letter to Einstein in 1954, **Max Born** complained about the evils of modern science:

"I read in the paper recently that you are supposed to have said: ‹If I were born a second time, I would become not a physicist, but an artisan`. These words were a great comfort to me, for similar thoughts are growing around in my mind, in view of the evil which our once so beautiful science has brought upon the world." (11)

This was said at a time, when the scale of the misuse of science was negligible with respect to what we are

witnessing today.

In our era there are two main considerations for the promotion of science and technology: 'seeking science for the sake of science' and 'seeking science for material goals and power'. The present industrial West has fallen into the trap of «technopoly» – to use Neil Postman›s terminology – and it has become a paradigm that whatever can be done must be done. Furthermore, with the emergence of big science, the goals of scientific and technological research are increasingly set by industry or governments whose objective is not truth but knowledge and power. It is forgotten that science and technology are supposed to secure humanity›s welfare and so their goal must be the good of humanity. This may require some constraints on certain areas of knowledge.

In the Islamic outlook, the sciences of nature should be keys to our cognition of the signs of God in the universe and for solving the individual and societal problems, without interrupting the cosmic order.

(iv) Fragmentation of human knowledge

One of the characteristics of scientists during the middle ages was their holistic view of nature. They considered all fields of knowledge as branches of the same tree, and tried to have a unitary view of nature. Today, due to excessive specialization, there is fragmentation of knowledge both across disciplines and within disciplines. Thus, e.g., people in sub-disciplines of a field of inquiry, like physics, are foreign to each other's vocabulary at the

advanced level. This leads to a lack of integral vision of the individual scientists and leads to a society of individuals, each seeking his/her personal interest.

Another problem is that a scientist›s worldview is shaped by the assumptions and methods of his/her specialty. Then, e.g., one who is working in biological science is tempted to assume that genes account for all of human conduct. Furthermore, being concerned only with one›s specialty, prevents one from paying attention to those elements which relate one›s discipline to a larger whole. Thus, fragmentation has deprived us from a holistic view of nature. Some of the eminent scientists and philosophers of our time have complained about the narrowness of the contemporary scientists› vision of reality. In the words of **Heisenberg**:

> *"Today the scientist's pride is love of detail, the discovery and systematizing of the smallest revelations of nature within a narrowly circumscribed field. This is naturally accompanied by a higher esteem for the craftsman in a special subject, the virtuoso, at the expense of an appreciation of the value of interrelations on a large scale. During this period one can hardly speak of a unified scientific view of nature, at least not as far as content is concerned. The world of the individual scientist is the narrow section of nature to which he devotes his life's work." (12)*

Another byproduct of this fragmentation is that physical and natural sciences are more or less indifferent to what goes on in humanities. But if science is to be practiced

by humankind and is to be used to solve humanity's problems, how could physical and biological sciences be divorced from humanities?

(v) Negligence of Humanity's Ultimate Questions

Because of the limitation of its scope, modern science cannot answer many questions of human concern-questions like 'What are we doing here?', 'What is the purpose of life?'-and it is silent about the meaning and purpose of human life and about morality. In the revealing words of **Erwin Schroedinger**:

> *"The scientific picture of the real world around me is very deficient. It gives a lot of factual information, puts all our experience in a magnificently consistent order, but it is ghastly silent about all and sundry that is really near to our heart, that really matters to us. It cannot tell us a word about red and blue, bitter and sweet, physical pain and physical delight; it knows nothing of beautiful and ugly, good or bad, God and eternity. Science sometimes pretends to answer questions in these domains, but the answers are very often so silly that we are not inclined to take them seriously." (13)*

The current scientistic worldview not only leaves all ultimate questions of human concern unanswered; it even denies the validity of such questions. Thus, the meaning of life has lost its significance, and human beings, under the overwhelming forces of technology, are demanding more and more material welfare, at the expense of their

spiritual dimension.

(II). Future Science

As we mentioned, science and technology have enabled humankind to control its physico-chemical and genetic environment, bringing about many blessings as well as curses to humanity. In fact, humankind is presently confronted by environmental pollution and degradation, mismanagement of natural resources, and enormous means of mass destruction. As we move into the future, the effects of science upon humanity increases at a rapid pace, and the question arises as to whether science should be allowed to develop freely without restrictions. Thus, there is an urgent need to eliminate the causes of curses that could be brought about by science and technology. We believe that this could be achieved, if the following steps are taken.

(1) As we saw, the development of science and technology for its own sake and without concern about its impact on society and environment has generated a real threat to the human race. There has to be a revival of moral concern in the scientific enterprise. This is especially true for our age that advances in molecular biology and genetic engineering has produced an unprecedented increase in human power over living beings, and without a moral compass anything can happen. As **Anthony Giddens** put it:

> *"Not just the external impact, but also the logic of unfettered scientific and technological development will have to be confronted if serious and irreversible harm is to be avoided. The*

> *humanizing of technology is likely to involve the increasing introduction of moral issues into the now largely ‹instrumental` relation between human beings and the created environment." (14)*

and in the eloquent and insightful words of **Freeman Dyson**:

> *«If technology continues along its present course, ignoring the needs of the poor and showering benefits upon the rich, the poor sooner or later rebel against the tyranny of technology and turn to irrational and violent remedies....The widening gap between technology and human needs can only be filled by ethics.... Ethics can be a force more powerful than politics and economics.The free market will not by itself produce technology friendly to the poor: Only a technology positively guided by ethics can do it.» (15)*

Since the days of Hippocrates, nearly 2500 years ago, there has been a code of ethical conduct for physicians. In our age that the fate of humanity lies in the hands of scientists, there is a need for an ethical code of conduct for all scientists, and there should be ethical committers for examining the long-term effects of proposed scientific projects. Unfortunately, a noticeable part of the scientific community has submitted itself to the demands of politicians and military establishments, without taking any responsibility for its acts. There has to be a serious reexamination of the role scientists are playing in developing the war industry, and scientists› involvement in arms› research projects should be stopped, and there should be vigorous discussions and debates on the uses of scientific knowledge. This

necessitates interdisciplinary work which includes physical and biological sciences as well as social sciences and humanities. These are supposed to deal with different issues of human societies, including ethical, social and environmental ones.

The inclusive worldview that accommodates future science should integrate science and ethics. This necessitates that scientists' training be accompanied by ethical education, in order to give them accountability and responsibility at all stages of life. This could be most effectively done in a religious context, where religion can provide justification and interpretation of moral values and can mobilize people for the preservation of the environment. As **E. F. Schumacher** put it:

> *"... it is impossible for any civilization to survive without a faith in meanings and values transcending the utilitarianism of comfort and survival – in other words, without a religious faith." (16)*

It is religion that offers a coherent understanding of life, humankind and cosmos.

(2) In the Middle Ages science used to be primarily a tool in mankind's search for truth, and it was meant to serve humanity at the practical level. Contemporary science has lost a large proportion of these goals. Today, scientific enterprise is funded mostly by governments, and in the industrially advanced countries it is mostly subordinated to immediate practical goals. Thus, those fields of knowledge are primarily supported that have utilitarian ends and lead

to the enhancement of the political and economic power. This commercialization of science has devalued it and has led to the dehumanization of the world. The goal of science has to be elevated to serve humanity›s higher inspirations. Only if science is subordinated to wisdom, it can bring happiness and salvation for humankind. **(3)** As we noticed, contemporary science deals with the physical aspects of our world and ignores supra-sensible realities. Its fundamental paradigm is to explain all natural phenomena in physico-chemical terms. Thus, there is no room for God in the natural order, and science addresses only the material needs of humankind and is sought for the control of nature and fellow humans. This has resulted in contemporary science presenting a limited view of reality, and has made science and its products as demonic tools for deviating humanity from its God-assigned role. The solution lies in changing the direction and goal of science and technology and in seeking a unifying framework which accommodates all levels of reality and all aspects of human life. **George Ellis** has put the matter elegantly:

> *«The underlying order of the universe is broader than described by the understanding of physics alone, and relates to the full depth of human experience, in particular providing a foundation for morality and meaning.» (17)*

To differentiate between the broader outlook and the regular scientific one, Ellis uses cosmology (with small c) to refer to the technical subject of physical cosmology and uses Cosmology (with capital c) to cover issues such

as values, purpose, religion, ultimate questions, etc.

In the Islamic worldview, reality has both material and non-material dimensions. Thus, future science must recognize both aspects of reality and their interaction. Only under the guidance of such a worldview, human beings can live in harmony with nature and with their fellow beings, and can have a more comprehensive view of reality.

(4) As **Bertrand Russell** had predicted (in 1923), most of the benefits of science has reached the wealthy and powerful, and scientific knowledge has not eliminated poverty. Thus, **Nehru's** dream of science solving the problem of hunger and poverty was not realized during the twentieth century. In fact, science and technology have failed to act as social equalizers, narrowing the gap between rich and poor, and to improve the quality of human life to an acceptable level. Future science should compensate for this uneven distribution of the blessings of science. Thus, science should become a shared asset for all people and should aim at the welfare of all mankind, rather than being means of domination over nature and fellow beings

(5) As we saw, fragmentation of scientific disciplines has deprived us from a unitary view of reality. Of course, one should not halt the progress of science by neglecting specialization, as it is neither feasible nor commendable. But, one must not forget the necessity of embedding one›s specialty in a wider frame of reference. Otherwise, one will lose a unitary view of reality and the meaning of one›s own existence.

Thus, we need an integration that preserves the unique features of each discipline, but, at the same time, shows how different disciplines can be integrated with other disciplines and how can all of them be related to a larger whole. One needs to consider the significance and status of various disciplines within the context of human person and the cosmos at large, and to arrange them into a hierarchy of levels according to their complexity – starting from physics and ending with humanities. This means that physics gives the most detailed information about the material world, and as we go up the scale, we reach humanities that describe human behavior.

Another important point is that scientific knowledge is not the only kind of valid knowledge, because there are areas of human concern about which science cannot say anything, Thus, e.g., science cannot say anything about moral values, about art works and about the supernatural. Furthermore, science can't deal with the ultimate questions of humanity- Why are we here? What are we doing here? etc. – and can't justify, by itself, it's very foundations. To handle these insistent deeper issues, science must yield relevance to humanities {religion, philosophy, etc. In the words of **Peter Medawar** (the Nobel laureate in medicine):

> *"It is not to science, therefore, but to metaphysics, imaginative literature or religion that we must turn for answers to questions having to do with first and last things." (18)*

It is the neglect of these meta-scientific questions that has dehumanized science. The appeal to magic, astrology and

mysticism in the West is a good testimony to the failure of science to satisfy humanity's deepest needs.

Thus, there has to be a reevaluation of the present educational system in order to instill some sense of breadth in students and to inform them about the interrelatedness of various disciplines. This could be done by adding sufficient number of humanity courses to the science and engineering curricula and to have across disciplinary collaborations and discussions. This kind of effort has started at some of the major universities of the West (like MIT, Stanford, Cambridge, Oxford, etc), but Islamic countries are well behind in this respect.

III. Conclusion

We mentioned that modern science has significantly advanced our knowledge of the physical world and has produced both blessings and curses for mankind. But the weight of the curses appears to threat humanity's future. We also echoed the opinion that the main cause of curses is the current worldview that underlies modern science. The received worldview has confined humanity to the material plain, has weakened humanity's sense of moral order, has taken the breadth from scientists' general outlook, and has put the science at the service of the powerful and the wealthy to exploit the nature and human beings. We believe that all of these curses could be prevented if the received worldview is enlarged to an inclusive one that embraces all needs of humanity - the material needs as well as the spiritual ones - and relates human life to the rest of the universe. One such inclusive framework is the

Islamic worldview – a God-centered worldview – which is rooted in the Islamic revelation, takes a holistic view of nature, admits a hierarchical structure for reality and has a long range concern for humanity. According to this worldview, humanity is part of a wider cosmic order and is supposed to harmonize all
of its activities, including the scientific and technological ones, with this cosmic order. Unless this fundamental change takes place in the mentality of the scientists of our generation, future science would lead to more destructive results than we have witnessed so far, and there would be no hope for the future of humanity.

Sources

(1) F. Dyson, «Can Science Be Ethical?» Christian Ethics Today, Vol. 3, No. 5, Dec. 1997.

(2) Jawaherlal Nehru, Proceedings of the National Institute of Science, 27 (1960), P. 564.

(3) Bertrand Russell, ICARUS or The Future of Science (London: Kegan Paul, Trench, Tubner & Co., LTD., 1924), P. 1.

(4) Ibid., PP. 62-63.

(5) W. Heisenberg, The Physicists Conception of Nature, trans. From German, A. J. Pomerans, (Westport, Conn.: Green Wood Press Pub., 1970), P. 84.

(6) B. Russell, Religion and Science (New York: Oxford Univ. Press, 1970), P. 243.

(7) K. R. Popper, «Natural Selection and the Emergence of Mind,» in Evolutionary Epistemology, Rationality and the Sociology of Knowledge, ed. Gerard Radnitzky & William W. Bartley, III (La Sall, Ill.: Open Court, 1987), P. 141.

(8) Quoted in E. F. Schumacher, A Guide for the Perplexed (London: Jonathan Cape, 1977), P. 14.

(9) Quoted in M. Artigas, The Mind of the Universe (Philadelphia: Templeton Foundation Press, 2000), P. 258.

(10) E. F. Schumacher, op.cit, P. 14

(11). Quoted in A. P. French, Einstein: A Centenary Volume (London: Heinmann Educational Books, 1974), P. 277.

(12) H. Heisenberg, Philosophical Problems of Quantum Physics (Woodbridge, Conn.: Ox Bow Press, 1979), P. 80.

(13) K. Wilber, ed., Quantum Questions (Shambhala: New Science Library, 1984), P. 81.

(14) Giddens, A. The Consequences of Modernity (Stanford University Press, 1990), P. 170.

(15) Freeman Dyson, op.cit,

(16) E. F. Schumacher, op.cit, P. 129.

(17). George Ellis, Before the Beginning (London: Boyars/Bowerdean,

1993), P. 125.

(18). P. Medawar, The Limits of Science (Oxford: OUP, 1984). P. 60

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